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Report No: PAD4627

INTERNATIONAL BANK FOR RECONSTRUCTION AND DEVELOPMENT

PROGRAM APPRAISAL DOCUMENT

ON

PROPOSED LOANS IN THE AMOUNT OF US\$600 MILLION

TO THE

TURKIYE SINAI KALKINMA BANKASI A.S. (US\$300 MILLION), AND
TURKIYE KALKINMA VE YATIRIM BANKASI A.S. (US\$300 MILLION)

WITH THE GUARANTEE OF THE REPUBLIC OF TÜRKIYE

AND

PROPOSED CLEAN TECHNOLOGY FUND (CTF) LOANS IN THE AMOUNT OF US\$30 MILLION

TO

TÜRKIYE SINAI KALKINMA BANKASI A.S. (US\$15 MILLION) AND
TÜRKIYE KALKINMA VE YATIRIM BANKASI A.S. (US\$15 MILLION)

PROPOSED ENERGY SECTOR MANAGEMENT PROGRAM (ESMAP) GRANT IN THE AMOUNT OF US\$3 MILLION

TO

TÜRKIYE SINAI KALKINMA BANKASI A.S. (US\$1.5 MILLION) AND
TÜRKIYE KALKINMA VE YATIRIM BANKASI A.S. (US\$1.5 MILLION)

FOR

ACCELERATING THE MARKET TRANSITION FOR DISTRIBUTED ENERGY (P176375)

November 29, 2023

Energy & Extractives
Europe And Central Asia

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CURRENCY EQUIVALENTS

(Exchange Rate Effective {Nov 07, 2023})

Currency Unit =

= US\$1

US\$ = SDR 1

FISCAL YEAR

January 1 - December 31

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ABBREVIATIONS AND ACRONYMS

BESS	Battery Energy Storage System
BRSA	Banking Regulation and Supervision Agency
C&I	Commercial and Industrial
CAPEX	Capital Expenditure
CAR	Capital Adequacy Ratio
CCDR	Country Climate and Development Report
CCGT	Combined Cycle Gas Turbine
CDP	Carbon Disclosure Project
CEO	Chief Executive Officer
CM	Combined Margin
CPF	Country Partnership Framework
CTF	Clean Technology Fund
DER	Distributed energy resources
DISCO	Distribution Company
DLI	Disbursement-Linked Indicator
DSPV	distributed solar photovoltaics
E&S	Environmental and Social
EIRR	Economic Internal Rate of Return
EMRA	Energy Market Regulatory Authority
EPC	Engineering, Procurement, and Construction
ERET	Environmental and Social Risk Evaluation Tool
ESG	Environmental, Social, and Governance
ESMAP	Energy Sector Management Assistance Program
ESMS	Environmental and Social Management System
ESSA	Environmental and Social Systems Assessment
EU	European Union
FCR	Frequency Containment Reserves
FB	Facility Borrowers
FIRR	Financial Internal Rate of Return
FiT	Feed-in-Tariff
FM	Financial Management
FX	Foreign Exchange
GDP	Gross Domestic Product
GESP	Global Energy Storage Program
GHG	Greenhouse Gas
GoT	Government of Türkiye
GRS	Grievance Redress Service
PIAs	Program Implementing Agencies (i.e. TSKB and TKYB)
IFC	International Finance Corporation
IMF	International Monetary Fund
IRENA	International Renewable Energy Agency
IVA	Independent Verification Agency

LCR	Liquidity Coverage Ratio
M&E	Monitoring and Evaluation
MENR	Ministry of Energy and Natural Resources
MoTF	Ministry of Treasury and Finance
MSMEs	Micro, Small, and Medium Enterprises
NDC	Nationally Determined Contribution
NDP	National Development Plan
NEP	National Energy Plan
NPL	Nonperforming Loan
NPV	Net Present Value
O&M	Operation and Maintenance
OECD	Organisation for Economic Co-operation and Development
PAP	Program Action Plan
PDO	Program Development Objective
PforR	Program-for-Results
PLR	Performance and Learning Review
POM	Project Operational Manual
PPP	Purchasing Power Parity
PUMREP	Public and Municipal Renewable Energy Project
PV	Photovoltaic
RE	Renewable Energy
RESCO	Renewable Energy Service Company
RoAA	Return on Average Assets
RoAE	Return on Average Equity
RSPV	Rooftop Solar PV
SDGs	Sustainable Development Goals
SMEs	Small and Medium Enterprises
SOFR	Secured Overnight Financing Rate
T&D	Transmission and Distribution
TCFD	Task Force on Climate-related Financial Disclosures
TEIAS	Turkish Electricity Transmission Corporation
TKYB	Development and Investment Bank of Türkiye (<i>Türkiye Kalkınma ve Yatırım Bankası</i>)
TSKB	Industrial Development Bank of Türkiye (<i>Türkiye Sınai Kalkınma Bankası</i>)
TTF	Title Transfer Facility
UNFCCC	United Nations Framework Convention on Climate Change
VAT	Value Added Tax
WBG	World Bank Group
WEO	World Economic Outlook
WFI	Women's Financial Inclusion
WHO	World Health Organization
YEKA	Renewable Energy Resource Area program (<i>Yenilenebilir Enerji Kaynak Alanı</i>)



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DATASHEET

BASIC INFORMATION

Project Beneficiary(ies)	Operation Name		
Turkiye	Accelerating the Market Transition for Distributed Energy		
Operation ID	Financing Instrument	Does this operation have an IPF component?	
P176375	Program-for-Results Financing (PforR)	No	

Financing & Implementation Modalities

<input type="checkbox"/> Multiphase Programmatic Approach (MPA)	<input type="checkbox"/> Fragile State(s)
<input type="checkbox"/> Contingent Emergency Response Component (CERC)	<input type="checkbox"/> Fragile within a non-fragile Country
<input type="checkbox"/> Small State(s)	<input type="checkbox"/> Conflict
<input type="checkbox"/> Alternative Procurement Arrangements (APA)	<input type="checkbox"/> Responding to Natural or Man-made Disaster
<input type="checkbox"/> Hands-on Expanded Implementation Support (HEIS)	

Expected Approval Date	Expected Closing Date
30-Jan-2024	30-Mar-2029
Bank/IFC Collaboration	
No	

Proposed Program Development Objective(s)

To expand Türkiye’s distributed solar photovoltaic market and pilot distributed battery electricity storage.

**Organizations**

Borrower:	TURKIYE SINAI KALKINMA BANKASI A.S. (TSKB), Ministry of Treasury and Finance, TURKIYE KALKINMA VE YATIRIM BANKASI A.S. (TKYB)
Implementing Agency:	TURKIYE KALKINMA VE YATIRIM BANKASI A.S. (TKYB)
Contact:	Ozlem Cinemre
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Implementing Agency:	TURKIYE SINAI KALKINMA BANKASI A.S. (TSKB)
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Title:	Executive VP
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COST & FINANCING (US\$, Millions)**Maximizing Finance for Development**

Is this an MFD-Enabling Project (MFD-EP)?	No
Is this project Private Capital Enabling (PCE)?	Yes

SUMMARY

Government program Cost	5,300.00
Total Operation Cost	930.00
Total Program Cost	928.50
Other Costs	1.50
Total Financing	930.00
Financing Gap	0.00

Financing (US\$, Millions)



World Bank Group Financing

International Bank for Reconstruction and Development (IBRD)	600.00
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Non-World Bank Group Financing

Trust Funds	33.00
Energy Sector Management Assistance Program	3.00
Clean Technology Fund	30.00
Commercial Financing	297.00
Unguaranteed Commercial Financing	297.00

Expected Disbursements (US\$, Millions)

WB Fiscal Year	2024	2025	2026	2027	2028	2029
Annual	60.00	188.25	193.50	114.75	63.00	13.50
Cumulative	60.00	248.25	441.75	556.50	619.50	633.00

PRACTICE AREA(S)

Practice Area (Lead)

Energy & Extractives

Contributing Practice Areas

CLIMATE

Climate Change and Disaster Screening

Yes, it has been screened and the results are discussed in the Appraisal Document

SYSTEMATIC OPERATIONS RISK- RATING TOOL (SORT)

Risk Category

Rating



1. Political and Governance	● Moderate
2. Macroeconomic	● Substantial
3. Sector Strategies and Policies	● Moderate
4. Technical Design of Project or Program	● Moderate
5. Institutional Capacity for Implementation and Sustainability	● Moderate
6. Fiduciary	● Moderate
7. Environment and Social	● Moderate
8. Stakeholders	● Moderate
9. Other	
10. Overall	● Moderate

POLICY COMPLIANCE

Policy

Does the project depart from the CPF in content or in other significant respects?

Yes No

Does the project require any waivers of Bank policies?

Yes No

LEGAL

Legal Covenants

Sections and Description

Conditions

Type	Citation	Description	Financing Source
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I. STRATEGIC CONTEXT

A. Country Context

1. **Türkiye's development achievements over the past two decades have been remarkable, but at the expense of elevated macro-financial vulnerabilities.** Real GDP growth averaged 5.4 percent between 2002 and 2022 resulting in income per capita (in real terms) more than doubling over the same period. Moreover, growth was accompanied by rapid poverty reduction with the poverty rate (\$6.85 2017 PPP poverty line) halving from above 20 percent in 2007 to around 10 percent in 2020. As in other countries, the COVID-19 pandemic had a negative impact on growth in 2020, but the country was one of the few that did not register a GDP contraction that year, instead growing 1.9 percent. This performance was due to a large extent to the government's economic policy response to the pandemic focusing on loosening monetary policy and rapid credit expansion. Moreover, supported by domestic and external demand, Türkiye achieved double-digit GDP growth in 2021 (11.4 percent) and maintained significant momentum in 2022 (5.5 percent). However, the policy framework that ensured a strong economic performance during and in the aftermath of the pandemic compounded by the effects of the war in Ukraine also heightened macroeconomic risks, including rising inflation (with annual inflation reaching 61.4 percent in October 2023 after having peaked at 85.5 percent in October 2022), currency depreciation (79 percent against the US\$ between January 2020 and October 2023), corporate and banking sector vulnerabilities, and a decline in reserve buffers. Following the May 2023 elections there have been positive steps aimed at the normalization of Türkiye's macroeconomic situation, but large imbalances from the previous over-accommodative policy stance persist.

2. **Türkiye aspires to achieve carbon neutrality by 2053, but reaching such a goal requires major changes in its energy system.** Türkiye's ratification of the Paris Agreement in October 2021 and its pledge to achieve net zero emissions by 2053, were strong signals of the country's commitment to join the global community in tackling the climate global emergency. As part of the Paris Agreement process, Türkiye submitted the first iteration of its Nationally Determined Contribution (NDC) to the United Nations Framework Convention on Climate Change (UNFCCC) in October 2021, outlining its climate actions and targets. The Government of Türkiye (GoT) is also currently working on its Long-Term Decarbonization Strategy and its next National Development Plan for the 2024-2028 period (NDP), which will further define measures and actions to address climate change. As shown by the Country Climate and Development Report (CCDR, 2022), Türkiye can also improve energy security through an accelerated pace of least-cost investments in domestic solar and wind—building on its track record of tripling renewable energy (RE) capacity in the last decade and investing in energy efficiency, battery, and pumped storage, geothermal, and gas generation with carbon capture and storage. This would require substantial commercial financing to enable the country to meet a doubling of energy demand by 2053 needed to fuel its growth ambitions, with the added benefits of lowering emissions and improving energy security.

3. **Increasing energy demand (expected 3 percent per year for the next 10 years), driven by Türkiye's growing economy, constitutes another macroeconomic challenge and an energy security risk.** The primary energy consumption in Türkiye has more than doubled over the past two decades to fuel economic growth and is projected to increase by 50 percent over the next two decades. A large portion of its energy demand (up to 75 percent) depends on imports (99 percent of gas and 93 percent of oils are imported), and its energy imports accounted for almost 20 percent of Türkiye's total imports in 2021. This contributes to massive current account deficits (US\$50.7 billion in 2021), fiscal and energy security risks. The country's high energy and carbon intensity, 145 ktoe/US\$ 2015 and 440 g CO₂e/kWh, respectively (well above the European Union [EU] averages which are 88 ktoe/US\$ 2015 and 229 g CO₂e/kWh, respectively), make it vulnerable to global energy prices. However, in response to increasing consumer energy price inflation (for 2022 around 137 percent), Türkiye has accelerated energy efficiency investments which made it second among Organization for Economic Co-operation and Development (OECD) countries in terms of improvement of energy intensity in 2021.



4. **Türkiye remains highly vulnerable to disaster and climate risks, including earthquakes¹ and more frequent extreme weather events.** It has a ‘high vulnerability’ in 9 out of 10 climate vulnerability dimensions, compared with a median of 2 out of 10 in other OECD countries.² Climate-related disasters have been striking with greater frequency and intensity over the last two decades. In 2019 alone, 935 extreme events occurred, caused mainly by heavy rains and floods, windstorms, snow, and hail. Climate models predict this trend to continue with increasing abnormalities in precipitation patterns with more frequent extreme rain and floodings, as well as protracted drought and wildfires, and sea-level rise.

5. **The proposed Program will help create a large market for commercial financing of distributed solar photovoltaics (DSPV) and battery energy storage system (BESS) to support Türkiye’s energy security and accelerate decarbonization, through a sustainable and scalable mechanism.** First, development of domestic renewable energy will enhance the country’s energy security: each MWh of distributed solar generation will displace natural gas generation (mostly imported) not only advancing the country’s decarbonization agenda but also its macroeconomic stability and energy independence. Second, as highlighted in the Türkiye CCDR, large investments would be required to decarbonize the Turkish economy, half of which are expected from the private sector. The proposed Program will leverage about US\$300 million in private sector financing mostly for segments that are commercially viable, like commercial and industrial (C&I) consumers, whereas higher shares of concessional/public financing will be deployed for subprojects targeting innovative markets. It will then support transition to a fully commercial financed market for C&I customers while helping kick-start other untapped market segments. This would enable a commercial scale-up phase leading to a mature market.

B. Sectoral and Institutional Context

There is strong government support for renewable energy development, including distributed energy resources (DER, combination of DSPV and BESS). However, availability of financing remains a key constraint to develop a domestic market ecosystem.

6. **Scaling up renewable energy is a core government development policy, critical to strengthen energy security and achieve the country’s 2053 net zero emission target.** Türkiye is endowed with considerable RE resources, including solar, wind, and geothermal. Utilizing these RE resources and achieving energy security has long been at the core of the government strategy. At the end of 2022, RE installed capacity (including hydro, wind, solar, and geothermal) reached a historical high at 49 GW, about 54 percent of the total installed capacity and 45 percent of Türkiye’s power generation. This achievement has significantly exceeded the original target of 38.8 percent of RE in the power generation mix by 2023), placing Türkiye as the fifth largest RE generator in Europe and the 12th largest in the world.

7. **Türkiye’s recently released National Energy Plan (NEP, 2022) includes an ambitious target to install 60 GW of generation capacity in RE by 2035 and achieve a share of RE of almost 65 percent in installed capacity and 55 percent in power generation by 2035** to meet the economy-wide net zero emission target by 2053. More specifically, the plan indicates that over 74 percent of the expansion in generation capacity (72 GW out of 96.9 GW) in the period should come from RE resources, most of it solar (52.9 GW total installed capacity by 2035) and wind (29.6 GW of total installed capacity by 2035) energy. Integration of such amounts of RE will call for substantial accompanying deployment of energy storage solutions, including Battery Energy Storage Systems (BESS). To enable the ambitious RE target and increase network flexibility, 7.5 GW in BESS is also to be deployed by 2035.

8. **Further development of DER, especially solar driven by the private sector, is necessary to achieve the 2035 RE generation targets.** Despite impressive growth in the RE market in recent years, Türkiye still uses only an estimated 3

¹ The February 6, 2023, earthquakes have resulted in the largest such disaster to hit the country in over 80 years.

² World Bank. 2022. *Country Climate and Development Report - Türkiye*.



percent of its solar and 15 percent of its onshore wind potential. The pace of installations will need to increase significantly to effectively harness the benefits of distributed generation (for example, limited strain on the T&D system in most cases) and further contribute to achieving Türkiye's ambitious RE generation targets.

9. **The potential for distributed solar in Türkiye is large, up to 8GW by 2030, which would already cover about 20 percent of the additional solar capacity planned by 2035.** This is in line with large scale deployment in developed and developing countries with about 59 GW of new DSPV capacity additions globally in 2022 – 65% of it in China, Europe and the United States.³ For C&I customers, the largest market segment, financial payback can be short, 6.7 years in our estimates, but financing the upfront capex is a key hurdle. While feed-in-tariff helped incentivize early DSPV deployment, its replacement in 2019 by a net-billing scheme means development is based on commercial viability.

The GoT has made significant progress to strengthen the enabling environment to support the DER market, but more remains to be done.

10. **The GoT has made important progress in defining its strategy to achieve carbon neutrality, but this needs to be translated into more granular and concrete sector-level actions.** As mentioned, the recently released NEP is a key milestone in setting energy sectoral targets by 2035, allowing the country to meet the carbon neutrality objectives by 2053. However, additional granularity is needed to inform implementation going forward. In this context, the GoT, and in particular the Ministry of Energy and Natural Resources (MENR), is working toward the release of the next Strategic Energy Plan, to cover the period 2024–2028. The new Strategic Energy Plan will provide further details on sectoral targets (including solar distributed generation and BESS) and refine implementation modalities.

11. **The GoT has strengthened laws and regulation for DER over time.** A regulation for 'unlicensed' electricity generation projects was issued in May 2019 (with subsequent amendments), to provide for generation facilities that can be established exempt from the obligations to obtain a preliminary license and license, and to establish a company. The regulation defines a list of eligible facilities including DSPV. The current regulation encourages self-consumption by capping distributed generation capacity based on the customer's 'contract power'⁴, with the possibility for certain categories of consumers to receive remuneration for any excess generation injected into the grid. More recently, the requirement for the generation installations to be located at the consumption point or in the same distribution zone as the consumption point(s) has been lifted and some consumer categories (that is, municipalities and industrial and agricultural irrigation facilities) may install up to 2 times their contracted capacity.

12. **Aggregation and third-party business models need to be enabled to scale up DER in Türkiye. Legislation changed in November 2022 allows for third-party business models and aggregation, while by-laws to implement such changes are under preparation.** Under the prevailing business model in Türkiye, customers own, install, and maintain DSPV on their own site with full up-front payment for the system (that is, capital expenditure [CAPEX] model). In countries with relatively advanced DSPV markets, third-party models are common, under which private service providers, also known as renewable energy service companies (RESCOs), own, finance, install, and maintain DSPV systems at a monthly fee charged to the customers or sign power purchase agreements to sell DSPV electricity to their customers. These types of business models are critical to expand access to RE and its benefits in the residential and MSME markets given the small size of individual systems, their decentralized nature, and credit risks of customers. Aggregation can help reduce the burden of high up-front costs, increase available services for customers, and reduce overall DSPV costs through bulk procurement. However, these models are not viable in Türkiye as the participation of aggregators in the energy market is not regulated

³ International Energy Agency estimate.

⁴ 'Contract power' refers to the installed power specified in the electricity project of a place of use, multiplied by the utilization factor.



yet. The November 2022 amendment of the Energy Market Law recognized aggregators, but related by-laws are still under development by the Energy Market Regulatory Authority (EMRA) to regulate their participation in the sector, including in the unlicensed electricity market.

13. **Further regulatory changes are also required to develop innovative private-driven solutions for BESS.** Following policy and legislative capacity-building support⁵, EMRA published on May 9, 2021, the *Regulation on Storage Activities in the Electricity Market* (and subsequent amended), which regulates the installation, connection, and general market activities for storage facilities and updated other regulations to incorporate storage. This regulation provides for electricity storage in unlicensed electricity generation facilities, as well as storage integrated into a consumption facility, and storage established by distribution companies, among other use cases. Türkiye announced 7.5 GW battery storage capacity target by 2035 through its 2022 NEP. EMRA started receiving license applications for BESS installations in early 2023. However, it is unlikely that these applications will result in actual installed capacity given that capital costs remain high and access to finance is limited for developers. This is in line with a World Bank analysis carried out in 2020–2022, which confirmed that very few BESS applications were commercially viable in Türkiye. Future enactment of targeted policy and regulations, including incentive systems, for storage would positively affect market confidence and allow early adopters to move ahead with investments in BESS. In particular, distributed BESS at C&I, and later residential, customers could in the medium-term help provide decentralized storage and ancillary services.

Innovative business models and financial support should be deployed to foster innovation in DER, especially for challenging markets such as BESS.

14. **Residential and MSMEs market segment remain untapped.** The market barriers mentioned above affect all market segments, but they are particularly acute for untapped markets, where availability of financing is coupled with a small number of business models tailored to the nature of such markets. Some commercial banks are considering various business models to reach out to individual consumers (for example, leasing and aggregation), but they struggle to operationalize them given the limitations of the current regulatory framework. The disaggregated nature of the residential sector poses specific challenges, which require piloting of innovative business models.

15. **Despite regulatory incentives mentioned above, BESS technology still requires support to develop and pilot business model applications that are viable in the Turkish market.** There is a limited number of developers ready to invest in BESS, mainly due to the developing regulatory context and limited commercial viability of existing solutions and limited number of business models to deploy energy storage solutions. This was confirmed by EMRA, which has received a limited number of applications for BESS technologies. The proposed program will provide financing for the private sector to pilot innovative business models to scale up DSPV deployment in untapped markets and innovative solutions such as BESS.

16. **In the context of a nascent DER market, developers and consumers across all market segments have difficulties securing access to long-term financing, highlighting market failures.** Most banks are not familiar with the DSPV market and have not yet developed the capacity to carry out due diligence for DSPV investments, even for C&I consumers. Retail DSPV customers tend to be residential clients or micro, small, and medium enterprises (MSMEs), whose target capacity requires a relatively small size of investment, ranging from a few thousand to a few million dollars. These customers face difficulties in accessing financing, mostly consumer loans with short tenors, due to a lack of collateral and poor credit rating.

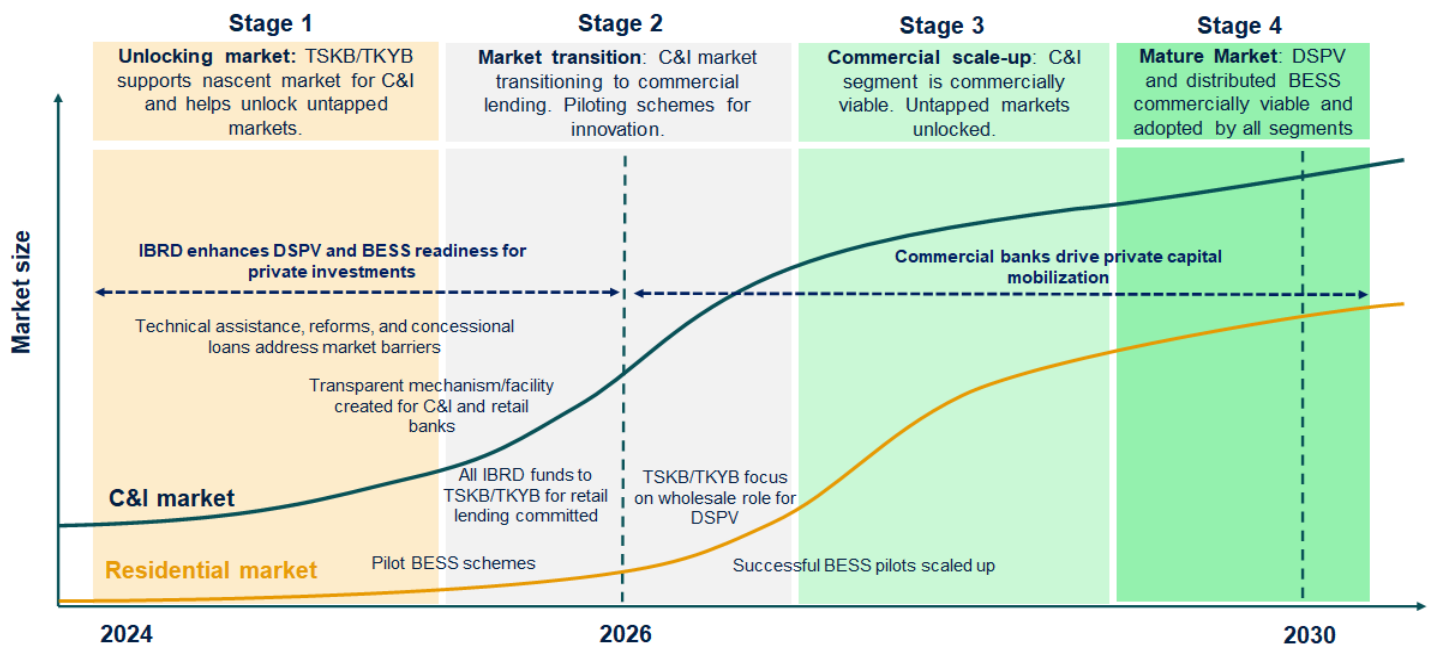
⁵ Provided under EU/IPA Energy Sector TA (P151934) project on electricity storage systems.



Accelerating the transition to a fully fledged commercial market for DER and distributed BESS will require a phased approach, characterized by strong public support in the early days, underpinned by a scalable financing mechanism.

17. Figure 1 below shows the key stages of such market transition, with the proposed World Bank Program targeting phase 1 and phase 2. In a first phase, the Program will engage with Türkiye’s two leading development banks as Program Borrowers (PBs), leveraging their technical and fiduciary experience to have a demonstrative effect and provide dedicated financing for DER and distributed BESS. In a second phase, the PBs will establish a facility to lend to commercial banks and other financing entities (Facility Borrowers [FBs]), who will access funds on-lent by the PBs; the PBs would transfer their technical and financial knowledge acquired on DER and BESS to the FBs, thereby enlarging the financial market for DER and BESS. In subsequent phases, public support is expected to decrease substantially, leaving more and more space to commercial financing until the market achieves full maturity.

Figure 1. Expected DSPV and BESS Market Transition in Türkiye



18. There is a strong development rationale for the GoT to select the privately-owned Industrial Development Bank of Türkiye (*Türkiye Sınai Kalkınma Bankası*, TSKB) and the state-owned Development and Investment Bank of Türkiye (*Türkiye Kalkınma ve Yatırım Bankası*, TKYB) as implementing entities to scale up the DER and BESS market during the first phase. TSKB and TKYB are Türkiye’s leading development banks. As Türkiye’s lead private and public development banks, TSKB and TKYB focus their activities on identified market gaps for nascent markets. Both institutions explicitly align their activities to the Sustainable Development Goals (SDGs) and climate change. TSKB and TKYB are also the market leader in green finance, providing a demonstration effect for the whole industry, and holds the best environmental, social, and governance (ESG) score among Turkish banks (and good scores globally. Despite their small size, providing less than 2 percent of total banking sector loans, their value creation and impact generation are above those of the sector. For instance, together, the two institutions have financed 22 percent of the country’s total RE capacity (TSKB 15 percent and TKYB 7.5 percent). Working with both banks will help further accelerate the market creation as it will allow reaching out to a larger network of subprojects developers, facility borrowers, and other market stakeholders. This will result in a larger and more diversified pipeline and enhanced ability to raise awareness and capacity building.



19. **During the second phase, commercial banks will lend to DSPV and BESS customers, thereby helping the financing market to grow and transition to fully commercial financing.** TSKB and TKYB will establish a transparent and inclusive facility through which they finance Facility Borrowers (FBs) which will on-lend to sub-project borrowers for DSPV and BESS investments. The selection process will be inclusive and transparent for all interested commercial banks and any other eligible private financier (such as a leasing company) in Türkiye. TSKB and TKYB will develop selection criteria reviewed by the World Bank to ensure FBs have appropriate resources and expertise (see also under the Technical Assessment Sections). Such FBs will also contribute their own financing and bring new DSPV and BESS projects, adding to the overall pipeline. Once the second phase has started, TSKB and TKYB will not lend directly anymore to avoid unfair competition with FBs.

20. **The Program delivery through development FIs is well suited to address the existing DER and BESS market failures⁶ considering the key role that the development FIs play in Türkiye in addressing the lack of affordable financing and helping create new markets.** Türkiye financial sector has faced obstacles such as the COVID-19 pandemic, the TL depreciation, soaring inflation, and regulatory changes causing distortions in the banking sector, particularly in credit markets before the last presidential election. Despite maintaining financial viability, commercial banks have shortened their loan maturities significantly and reduced their investment loans. TSKB and TKYB mitigate this market failure stemming from challenges in accessing finance and credit assessment by bringing long-term investment finance to the energy sector and setting industry standards for commercial banks. Leveraging their expertise and World Bank safeguard standards, both banks guide project developers and commercial banks, facilitating a sustainable solar PV and BESS market.

21. **TSKB and TKYB are financially solid and well placed to increase awareness and capacity and as such raise industry standards, including environmental and social (E&S) aspects, for the nascent DSPV and BESS banking industry. The proposed Program will leverage such leadership role in the transition to Phase 2.** In addition to their development financing mandate, TSKB and TKYB also stand out from deposit-taking commercial banks due to: (a) their funding model, as they are not deposit-taking banks; (b) their longer-term financing to the private sector; and (c) their expertise in wholesale (that is, apex) banking, which is particularly relevant for reaching out to DSPV and BESS untapped and challenging markets. Both institutions are influential in capacity building and transferring IBRD objectives through ESG-oriented projects and technical advisory via wholesale banking to other deposit-taking commercial banks and leasing companies and private sector financing including SMEs. TSKB's apex banking operations, which started in 2004, have been a success story with a range of loan packages provided from international financial institutions. TKYB is also active in this area and organized training programs for relevant financial institutions in collaboration with the IBRD E&S team. TSKB and TKYB currently have adequate financial viability, but risks need to be continuously monitored.

22. **Finally, as experience from other countries like India shows, a large and credit-worthy market is needed to create the ecosystem to attract private sector financiers and providers that will allow the DER and BESS markets to grow and innovate.** Despite recent regulatory changes aiming to create a more conducive environment to scale up investments in DSPV and in BESS, important challenges remain to unlock access to financing. The proposed engagement will leverage private sector financing to tap into the C&I segment—the most financially viable segment—and have a demonstrational effect to anchor the development of the broader DSPV and BESS markets. Supporting C&I clients will help de-risk and develop the broader distributed solar generation ecosystem to lower overall costs and make the most

⁶ The option of lending directly to third-party aggregators (for example, energy service companies and engineering, procurement, and construction [EPC] companies) and DISCOs/retailers was explored during project preparation but was found unfeasible due mostly to the small size and disaggregation of the market. Direct subsidies to consumers to buy down the cost of DER equipment was also considered but strongly opposed by the GoT due to direct impacts on its fiscal space. Channeling such support through FIs, which will be able to leverage limited public financing available, provides additional flexibility in targeting and phasing out support over time and facilitates the leveraging of private sector capital, to bring the DER market up to scale.



challenging market segments viable as a customer base while providing a premium to early movers who are taking the current market risk. Further, the Program will support the development and implementation of new innovative financing and business models to target the more difficult untapped markets while also fostering the creation of the enabling environment for deployment of new technologies such as battery energy storage system (BESS).

C. Relationship to the CPS/CPF and Rationale for Use of Instrument

23. **The proposed operation supports achieving a key objective of the World Bank Group (WBG) Country Partnership Framework (CPF) for Türkiye for the period FY18–FY23⁷ as amended by the Performance and Learning Review (PLR) of CPF⁸ and is aligned with the Government’s strategies.** The World Bank program continues to support Türkiye’s progression to higher-income status, in close alignment with the Government’s strategies. The program contributes to Objective 7 (Improved reliability of energy supply and generation of green energy) and Objective 9 (Strengthened results under climate action agenda) of CPF Focus Area 3 - Sustainability, which remain key priorities of the energy sector cooperation between the GoT and the World Bank. The operation is also expected to be aligned with the next CPF for the period FY24–FY28⁹ which, building on Türkiye’s CCDR and the upcoming Systematic Country Diagnostic, will continue to support Türkiye in achieving its climate neutrality and sustainable development objectives.

24. **The proposed Program-for-Results (PforR) has been requested by the GoT as an important program to channel climate financing and help achieve the solar PV capacity target of 52.9 GW by 2035 set in the NEP, contributing to Türkiye’s carbon neutrality.** Large-scale deployment of DSPV generation, as well as BESS, have the potential to transform and further modernize Türkiye’s electricity sector in the medium term. Both technologies are expected to play a significant role in Türkiye’s economic development, as they can reduce the overall cost of generating, transmitting, and distributing electricity while fostering economic growth and improved environmental sustainability. The GoT is thus keen to demonstrate business models that can succeed without the need for capital subsidies.

25. **This operation is substantially contributing to Türkiye’s decarbonization pathway and global sectoral decarbonization pathways and is aligned with the goals of the Paris Agreement.** One of the key mitigation aspects in Türkiye’s updated NDC, submitted to the UNFCCC in April 2023, is an ambitious 41% reduction in GHGs by 2030. The overarching development objective of this program is to expand the DSPV and BESS market, directly contributing to the country’s mitigation strategy outlined in its NDC and thereby contributing to GHG emission reductions. In addition, Türkiye’s CCDR identifies the country’s potential to reach resilient and net zero pathway by investing in solar and wind energy and battery storage systems. Therefore, the program is directly linked to both the NDC and CCDRs of Türkiye. In addition, investments in distributed RE for self-generation and BESS will promote resilience when facing natural disasters exacerbated by climate change such as floods or droughts. Finally, under the climate memorandum of understanding, the World Bank has committed to support Türkiye’s sustainable development and climate goals, particularly its low emissions and climate-resilient development, by providing additional lending worth US\$2 billion in FY22–24, particularly on RE for climate mitigation. Therefore, this operation is aligned with the goals of the Paris Agreement.

26. **This is the first PforR in Türkiye. Alternative lending instruments were considered, but the PforR was deemed most suitable to address the GoT’s request and support its ambitious target for scaling up renewables.** The PforR instrument was deemed better suited as it can address the policy and regulatory barriers, as well as institutional strengthening, together with investments—all in one package. Alternative instruments, including guarantees, were

⁷ Report No 11096-TR; August 29, 2017.

⁸ The CPF was initially designed to cover the FY18–21 period, then was updated and extended to include FY22–FY23 through the Performance and Learning Review (PLR) of CPF (Report No 142353-TR; March 13, 2020).

⁹ Türkiye Country Partnership Framework FY24-FY28 is to be submitted to the World Bank Board of Executive Directors for discussion in FY24.



considered but rejected by the GoT, as liquidity, rather than risk mitigation, is currently needed to increase access to financing for DSPV. The GoT and the World Bank agreed to use the PforR instrument for the first time in Türkiye given the following objectives: (a) ensuring a sharper focus on results, including on addressing the policy and regulatory barriers to DSPV and BESS for a transformational impact and to make the investments more sustainable; (b) supporting the development of the market through FIs (including commercial banks), strengthening their own systems and procedures, and reinforcing the institutional capacity needed for the Program to mainstream financing for DSPV and BESS in local financial institutions to achieve the desired results; and (c) prioritizing the mainstreaming of loans for DSPV and BESS at the two PIAs by piloting innovative financing models and products through apex structures to ensure the sustainability of project benefits.

II. PROGRAM DESCRIPTION

A. Government program

27. **Türkiye’s 2022 National Energy Plan (NEP) outlines an ambitious vision for renewable development and BESS up to 2035 based on the country’s 2053 net zero emission target.** Per the NEP, Türkiye plans to add 60 GW of solar and wind power by 2035, or an estimated 3.5 GW of solar and 1.4 GW of wind power needs to be added per year. To increase network flexibility, 7.5 GW in BESS is also to be deployed during this period. The proposed PforR operation directly contributes to this goal by enabling an increase in installed solar capacity and by catalyzing market development, including through the development of capacity of financial institutions to finance rapid organic growth in DSPV beyond the program. As of the end of 2022, Türkiye achieved 9.5 GW of installed power capacity for solar energy, and as of April 2023, total solar installed capacity has reached 9.9 GW. This is well in line with the target in the Energy Strategic Plan to reach 10 GW of installed solar capacity by 2023.

Figure 2. Türkiye National Energy Plan targets, potential for DSPV and contribution from the PforR



Note: Total additional solar capacity includes utility-scale generation through independent power producers/auctions (YEKA Program).

*WBG Market Analysis 2021.

28. **The PforR will contribute to the implementation of the NEP, supporting up to 25 percent of the potential DSPV market.** About US\$22 billion investment would be required to achieve the 2035 target of 52.9 GW for installed solar capacity, including both utility scales and distributed generation. A World Bank and IFC market analysis carried out in 2021 showed the potential for the DSPV market to be a minimum of 4.5 GW by 2030, requiring at least 750 MW of new DSPV per year and US\$3.8 billion of financing. Most investments will come from local RE developers, consumers, and financial institutions. MENR’s Strategic Plan also noted that measures must be taken to develop financing facilities and incentives

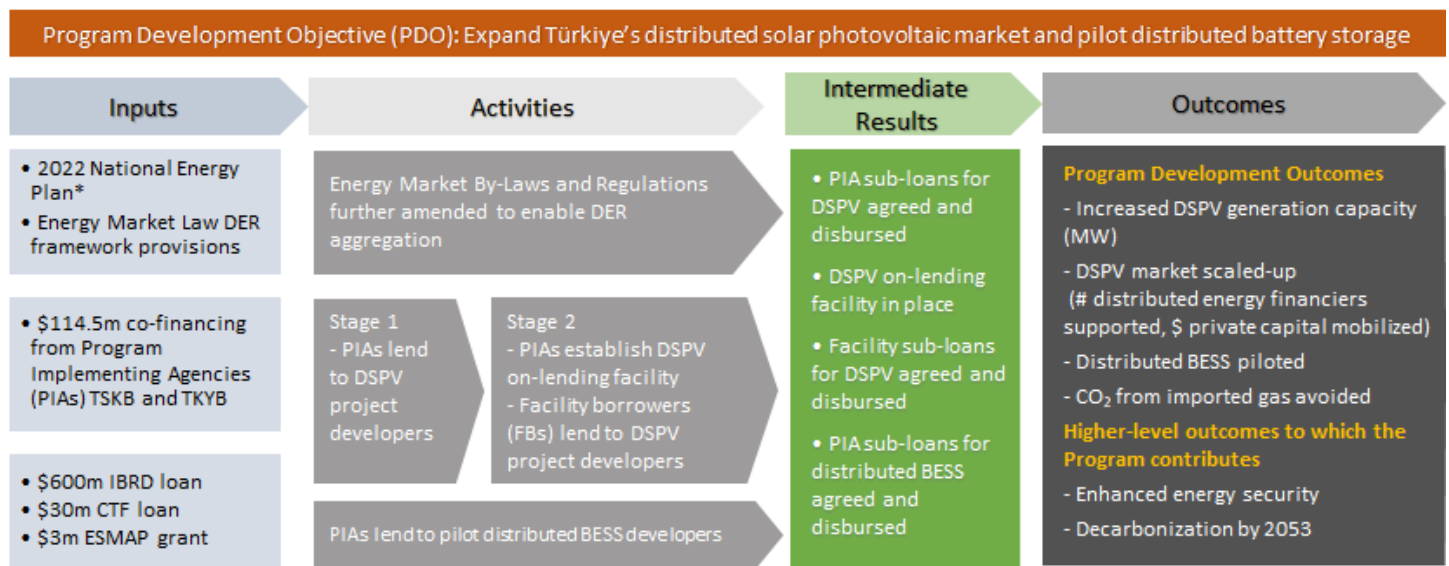


for RE and energy storage systems investment to materialize their high potential. Therefore, market mechanisms supported under the PforR will be essential to achieve the program target by addressing market failures and unlocking commercial financing.

B. Theory of Change

29. **The program will establish a sustainable and scalable structure to develop the DSPV and BESS market in Türkiye and be structured around two results areas:** (a) Scaling-up DSPV; and (b) Expanding the market and promoting innovation for distributed energy, including distributed BESS. As illustrated in the results chain in Figure 3, the outcomes achieved through the Program activities outlined will help enhance Türkiye’s energy security and mitigate climate change through the use of more sustainable energy sources to fuel economic growth. The results areas are further defined below.

Figure 3. Theory of Change of the Program



*The 2022 NEP targets 53 GW PV, 7.5 GW battery capacity (assuming 2 hours charging time) and 1.7 GW demand-side response by 2030 to meet 4.1% annual average growth in electricity demand growth.

C. PforR Program Scope

30. **The proposed Program is closely linked with the NEP and the results areas described under Objective 1, ‘Ensure sustainable security of supply’ of MENR’s Strategic Plan 2019–2023.** The PforR is designed to focus on the areas underperforming in Türkiye’s DER market. MENR’s Strategic Plan highlights that the country has high untapped RE potential and that it needs investments to increase the integration of renewable and distributed generation to the electricity system. In addition, it recognizes the need to develop the regulatory framework for battery storage, together with a cost analysis and an assessment of viable financing models for fixed energy storage systems. This Program will help the GoT objectives to increase the use of domestic (that is, non-imported) primary energy resources and increase self-consumption of on-site clean energy generation.

31. **With limited commercial financing currently readily flowing toward the DSPV market, the World Bank financing will accelerate development of the market and transition to commercial banks financing.** The inadequate provision of green financing represents a market failure that warrants public sector intervention via blended finance mechanisms,



which can attract the crucial private (in this project, commercial) finance needed in this area. As shown in Figure 1 the PforR will support Phase 1 and Phase 2 of the overall market transition for DER.

32. **The geographic coverage of the PforR operation will be nationwide in line with the government program.** The duration of the PforR will be five years, with the expected start in 2024 and the target completion in 2029. The MENR Strategic Plan is from 2019 to 2023, finishing just as the proposed PforR begins. However, a new MENR strategic four-year plan for the period of 2024–2028 is currently under development and will be effective in 2024 with enhanced targets for RE and ambitious goals for climate change mitigation, in line with the NEP published in 2022. The new strategic plan is also expected to be fully in line with the upcoming 12th NDP (2024–2028), which will advance Türkiye’s long-term sustainability objectives.

33. **The proposed PforR will focus on unlocking private sector investments and innovation in DSPV and BESS,** thereby contributing to the achievement of the GoT’s solar PV and BESS targets. Specifically, the proposed Program will focus on two results areas:

- (a) **Results Area 1 - Scaling-up distributed solar PV.** Investments will support the installation of grid-connected distributed solar PV systems. The DSPV systems could include rooftop solar photovoltaic (RSPV) and ground-mounted solar PV, as well as newer technologies such as façade PVs and floating PV. The systems installed will be primarily for self-consumption, eligible for net metering¹⁰ and connected to the distribution grid. This results area targets the C&I market segments, which are essential to create the broader market ecosystem for DSPV. The eligible sub-borrowers include DSPV customers, DISCOs, leasing companies, and aggregators who own, operate, and maintain the DSPV systems for customers to supply electricity to C&I buildings.
- (b) **Results Area 2 - Expanding the market and promoting innovation for distributed energy, including BESS.** This will help unlock commercial financing at scale for DSPV and support innovation for BESS. Under this results area: (i) the two Program Implementing Agencies (PIA) will set up a facility to finance commercial banks selected transparently and competitively; and (ii) these commercial banks will finance DSPV projects, including through their own financing. A recipient-executed grant of US\$3 million from the Energy Sector Management Assistance Program (ESMAP) will be disbursed against the DLI for establishment of the facility. Separately, a Clean Technology Fund (CTF) US\$30 million credit will support BESS investments financed by the PIAs, having an important demonstrational effect for the market and the broader banking industry. Eligible sub-borrowers for battery storage include renewable developers, battery storage companies, aggregators, and DSPV consumers.

34. **The facility will be designed for scalability and could receive financing from other development partners.** The operation will establish a blueprint primarily founded on the C&I market for DSPV and pilots for distributed BESS, with a view of expanding further into the household sector and distributed BESS. The facility is designed to allow for participation from other development partners to accelerate scale and impact.

35. **In addition, the Government continues to strengthen the enabling environment for DSPV and BESS.** During preparation, MENR and EMRA have already amended the energy market law to provide for aggregation of DER. These policy and regulatory environment facilitate the scale-up of DSPV and BESS by addressing key market barriers. Going

¹⁰ Only distributed PV subprojects that qualify for ‘unlicensed’ electricity production pursuant to the ‘Unlicensed Electricity in the Electricity Market Production Regulation’ No. 30772 published in the official gazette on May 12, 2019, and its subsequent amendments will be eligible for financing under the Program.



forward, activities included under the Program Action Plan (PAP) also include enactment of by-laws to fully provide for aggregation of supply-side and demand-side DER and publishing the Strategic Energy Plan 2024-2028.

36. **Program beneficiaries.** The direct beneficiaries are: (a) DSPV and BESS customers who can benefit from reduced energy costs by installing DSPV systems; (b) the national government, particularly MENR and EMRA, which are responsible for advancing the RE agenda and its regulation; (c) commercial banks whose awareness, capacity, and financing will be increased; and (d) aggregators, equipment manufacturers, service suppliers, and project developers who are engaged in DSPV services and operations. Indirect beneficiaries include the general public with an improved environment (for example, reduced air pollution) as a result of RE use, and the global community, including through climate change mitigation.

Table 1 Alignment of PforR with the government program

	Government program	PforR	Reasons for Nonalignment
Objective	2022 NEP targets 32.9 GW PV, 2.1 GW battery (assuming 2-hour charge duration) and 900 MW demand-side response by 2030 to meet 4.1% annual average growth in electricity demand growth	Expand the DSPV energy market and pilot distributed battery storage	Focus on the subset of DER market
Duration	2022 NEP sets target for 2025, 2030 and 2035 on a path to net-zero emissions by 2053	2024–2029	PforR duration covers the coming 5 years.
Geographic coverage	Nationwide	Nationwide	
Results areas	‘Installed power capacity based on solar energy (MW) to achieve 52.9 GW by 2035’ Update of the legislation governing unlicensed electricity generation and BESS	Results Areas 1 and 2.	The PforR is a sub-set of the government program.
Overall financing	Approximately US\$22 billion to scale up from 10 GW to 52.9 GW for solar PV, of which about US\$4–7 billion for DSPV.	US\$930 million	The PforR intends to finance a subset of GoT’s NEP by focusing on DSPV and BESS.

Program Financing

37. The total Program financing is around US\$930 million, consisting of: (a) US\$600 million IBRD financing, (b) an expected US\$30 million financing to support energy storage system investments from the CTF, (c) US\$3 million grant from ESMAP, (d) US\$139 million in equity financing, (e) co-financing equivalent to 25 percent of the IBRD and CTF loans resulting in about US\$114 million from TSKB and TKYB and US\$44 million from commercial banks. The US\$30 million CTF financing will be solely directed to investments in BESS. The US\$3 million grant from ESMAP will be disbursed against the DLI for establishment of the Facility, to help cover the cost to PIAs of high-quality outreach, awareness raising and capacity building of FBs and thus contribute to DSPV market development. The availability of CTF funding has been confirmed, and the formal request for approval [is under review by CTF]. The US\$3 million grant from ESMAP remains to be confirmed.

Table 2 Program Financing

Source	Amount (US\$, millions)	% of Total
IBRD	600.0	64.5



Source	Amount (US\$, millions)	% of Total
Co-financing from TSKB and TKYB	114.0	12.3
Co-financing from commercial banks	44.0	4.7
Equity from private actors	139.0	14.9
CTF credit	30.0	3.2
ESMAP grant	3.0	0.3
Total Program Financing	930.0	100.0

38. **The operation is aligned with Maximizing Finance for Development approach.** The government is actively seeking to crowd-in private sector investments in the DER sector. Private capital mobilization (PCM) is expected to be around US\$ 240 million. When including co-financing from both PIAs, and FBs, other private debt, and equity from beneficiaries, average mobilization of private capital across subprojects would be around 50 percent, meaning that each dollar of IBRD funding would leverage US\$0.50 of private funding.

D. Program Development Objective(s) (PDO) And PDO Level Results Indicators

39. The PDO is to expand Türkiye’s distributed solar photovoltaic market and pilot distributed battery electricity storage.

40. The proposed PDO-level indicators would be:

- (a) Renewable energy generation capacity enabled (MW);
- (b) Distributed energy financiers supported (number);
- (c) Private capital mobilized (US\$, million);
- (d) Distributed BESS piloted (yes/no); and
- (e) Greenhouse gas emissions from imported fossil gas avoided (metric tons CO2 equivalent).

E. Disbursement Linked Indicators and Verification Protocols

41. **DLIs are key results linked to the PforR and will trigger the disbursements upon achievement.** DLIs in Results Area 1 are linked to the investments to scale up DSPV while DLIs in Results Area 2 targets financing barriers and innovation. All DLIs are summarized in Table 3 below.



Table 3. Program DLIs

DLIs	Description of DLIs	Disbursement Amount (US\$, millions)
Results Area 1: Scaling up distributed solar PV (DSPV)		
DLI 1.1: TSKB sub-loans for DSPV (US\$, million)	Sub-loans from PIAs to sub-project borrowers for DSPV. The end-of-program target of this DLI is US\$269.0 million for each PIA.	145.0 (IBRD)
DLI-1.2: TKYB sub-loans for DSPV (US\$, million)		145.0 (IBRD)
DLI-2.1: Generation capacity under TSKB sub-loans (MW)	Generation capacity from DSPV sub-projects financed with PIA sub-loans. Given the potential large number of solar PV units installed, the verification of this DLI will be on a sampling basis, in each market segment. The end-of-program target of this DLI is 317 MW for each PIA.	56.25 (IBRD)
DLI-2.2: Generation capacity under TKYB sub-loans (MW)		56.25 (IBRD)
Results Area 2: Expanding the market and promoting innovation for distributed energy		
DLI-3: DSPV on-lending facility in place (Text)	Establishment of a transparent and inclusive facility by the PIAs (TSKB and TKYB) through which they finance Facility Borrowers (FBs) to on-lend to sub-project borrowers for DSPV investments. Four DLRs capture incremental progress for establishing the facility.	22.5 (IBRD) 3.0 (ESMAP)
DLI-4.1: Facility sub-loans by TSKB (US\$, million)	Facility sub-loans disbursed to sub-project borrowers to finance DSPV. The end-of-program target of this DLI is US\$109.0 million for each PFI.	65.0 (IBRD)
DLI-4.2: Facility sub-loans by TKYB (US\$, million)		65.0 (IBRD)
DLI-5.1: Generation capacity under facility sub-loans by TSKB (MW)	Sub-loans disbursed to sub-borrowers to finance DSPV investments. The end-of-program target of this DLI is 122 MW for each PIA.	22.5 (IBRD)
DLI-5.2: Generation capacity under facility sub-loans by TKYB (MW)		22.5 (IBRD)
DLI-6.1: TSKB sub-loans for BESS [CTF] (US\$, million)	Sub-loans disbursed to sub-borrowers to finance BESS investments. The end-of-program target of this DLI is US\$15 million for each PIA.	10.0 (CTF)
DLI-6.2: TKYB sub-loans for BESS [CTF] (US\$, million)		10.0 (CTF)
DLI-7.1: BESS capacity under TSKB sub-loans (MWh)	Installed BESS capacity (MWh) financed in subprojects. Eligible types of battery storage include generation, transmission, distribution grids, and consumers. The end-of-program target of this DLI is 32.0 MWh for each PIA.	5.0 (CTF)
DLI-7.2: BESS capacity under TKYB sub-loans (MWh)		5.0 (CTF)

42. **Verification protocol and arrangement.** A third-party independent verification agency (IVA) will be competitively selected by the PIAs to verify the DLI results using the agreed verification methods. The qualifications of a third-party IVA, including expertise and experience both in financial auditing and in the RE field, should be satisfactory to the World Bank. PIAs will jointly select a single IVA to ensure consistency and transparency in carrying out verification. Results verification methodology, protocol, and procedures are available in Annex 1 and will be further outlined in the Program Operational Manual (POM).



III. PROGRAM IMPLEMENTATION

A. Institutional and Implementation Arrangements

43. **Government.** MENR will provide overall policy guidance and help ensure that the results and lessons from this PforR Program are incorporated internally and factored into future planning and strategy for RE generation. Further, MENR and EMRA are responsible for improving the policy and regulatory frameworks for DSPV and BESS and achieving actions under the Program Action Plan. MENR has the overall oversight of the RE policies and targets, while EMRA is responsible for preparation of secondary legislation, setting out the pricing principles for regulated tariff and its approving, drafting, amending, enforcing, and auditing performance for standards, distribution, and customer services code.

44. **Borrowers.** The borrowers and program implementing agencies (PIAs) are TSKB and TKYB, who will lend directly to DSPV customers, developers, and aggregators in a first stage and indirectly through facility borrowers (FBs) in a second stage. The two PIAs are responsible for achieving the DLIs. The two PIAs will bear 100 percent default risks, as they are responsible for reviewing, appraising, and approving the eligible sub-loans, and the responsibilities need to be aligned with the risks. The detailed eligibility criteria will be outlined in the POM, which is currently being prepared by the PIAs and will be agreed between the World Bank and the PIAs. Lending criteria will be formulated based on customer prospects that are identified directly by the PIAs, including during implementation.

45. **Funds flow.** IBRD, CTF, and ESMAP disbursement will be directed to the PIAs, upon the achievement under the agreed DLIs. The IVA (hired by TSKB and TKYB)—following the agreed-upon verification protocol—will validate the achievement under the DLIs and allow for the associated disbursements. For Results Areas 1 and 2, the PIAs will receive the IBRD, CTF, and ESMAP disbursements upon achieving the DLIs. The funds flow will be as follows: (a) the World Bank will sign a loan agreement with TSKB and TKYB, with Ministry of Treasury and Finance (MoTF) guarantee, (b) TSKB and TKYB will sign loan agreements with sub-borrowers during the first phase, and (c) TSKB and TKYB will sign on-lending agreements with commercial banks who will sign loan agreements with sub-borrowers during the second phase. Once achievement of the DLIs is verified by the IVA and the World Bank approves the verification report, IBRD funds will directly flow to TSKB and TKYB.

B. Results Monitoring and Evaluation

46. **Under this PforR operation, TSKB and TKYB, as the implementing agencies, are responsible for results monitoring and evaluation (M&E) and verification of the DLIs,** based on the agreed verification methodology, protocols, and procedures outlined in the POM and validated by the IVA. This PforR program adds value to strengthen the focus on results M&E through an independent and credible verification system.

C. Disbursement Arrangements

47. **Annex 2 provides the list of DLIs, the disbursement amounts, and the protocols for their verification.** After the World Bank formally considers the DLI met, the PIAs can then submit withdrawal applications for the disbursement of the relevant amount. Advances of up to 25 percent of total World Bank financing for the program, or US\$150 million, can be made to the PIAs. When the DLI(s) against which an advance has been disbursed is(are) achieved, the amount of the advance will be recovered from the total amount due to be disbursed under such DLIs. The World Bank requires that the borrower refund any advances (or portion of advances) if the DLIs have not been met (or have been only partly met) by the closing date, promptly upon notice thereof by the World Bank. The combination of the advance payment and disbursements for prior results cannot exceed 30 percent of the World Bank financing.

D. Capacity Building



48. **An important element of this operation is to enhance the capacity of the agencies involved in the implementation of the GoT program, with potential positive impacts for the whole banking industry in Türkiye.** The program implementation support will help TSKB and TKYB further mainstream RE and green financing and strengthen the industry capacity to pilot innovative business models and deliver new financial products for DSPV. These activities have been incorporated into this PforR program with specific DLIs linking disbursements with these important market ecosystem results to incentivize the PIAs. Across the World Bank energy portfolio in Türkiye, other projects are also providing support to EMRA and MENR in program relevant areas. TSKB and TKYB will also help raise capacity and standards of commercial banks involved in DSPV financing, including with workshops on E&S aspects.

49. **Furthermore, the two PIAs will strengthen their capabilities in M&E of results.** The two PIAs also need to enhance their financial management (FM), and E&S capacities. The World Bank team will provide training to the PIAs to strengthen capacity in these areas. Detailed capacity-building activities are being assessed and will be outlined in the Program Action Plan (PAP) section.

IV. ASSESSMENT SUMMARY

A. Technical (including program economic evaluation)

50. **Strategic relevance.** Meeting the growing electricity demand through domestic RE resources, and reducing air pollutants and carbon emissions, particularly through a combination of solar energy and battery storage options is a priority for the GoT. The proposed Program is thus strategically relevant and aligned with the GoT's decarbonization priorities and energy security objectives.

51. **Technical soundness.** The Program will finance technically proven, mature, widely marketed clean energy technologies (solar PV and lithium-ion battery storage). A detailed list of eligible technologies is included in Annex 2. Solar PV already has a long track record in Türkiye whereas experience with BESS installation is less common. However, BESS technologies are already mature in the international market and there is a variety of international suppliers and integrators that can offer solutions.

52. **Pipeline.** TSKB and TKYB have strong initial pipelines of DSPV subprojects for C&I customers. Preliminary subproject pipeline estimates obtained from clients indicate that there are about 55 subprojects, equivalent to almost 1 GW of DSPV. Both PIAs' pipelines include rooftop solar and ground-mounted installations. All subprojects are for self-consumption, falling under Türkiye's unlicensed generation regulation, and would be connected to the distribution grid. For storage subprojects, the preliminary pipeline includes about 70 MW of subprojects, all of ground mounted type across different locations in Türkiye. Towards this end, the CTF financing will be vital because it is concessional financing and will allow for the scale up of BESS subprojects in the coming years. At the current stage, this is a preliminary set of subprojects and final investment decision to finance a project will depend on detailed due diligence that will be carried out according to the criteria mentioned below.

53. C&I customers in the pipeline represent a large diversity of sectors, including iron and steel, mining and metal, white goods component manufacturing, food, chemicals, textile, construction, energy, transportation, tourism, and health care. Many of these companies are also exporters and thus subject to the EU Carbon Border Adjustment Mechanism, which represents a strong incentive for them to invest in greening their energy supply. These strong pipelines of unrealized projects show that demand for DSPV is high in Türkiye, and demand for BESS emerging, but that financing is not widely available.



54. **Technical, economic and financial assessment of sub-projects.** PIAs and FBs will evaluate all DER sub-projects through a well-defined technical assessment framework which will be included in the POM and Facility Operational Manual (FOM) – DLR under DLI 3), which will be subject to Bank’s approval. Sub-projects will need to be in an advanced stage of maturity and would be comprehensively assessed considering the following eligibility criteria: (i) full conformity to the policies and regulations related to DER in Türkiye and relevant Program eligibility criteria; (ii) equity and private debt leveraged; (iii) sponsors’ experience; (iv) size of MW for each subproject and number of subprojects under the same borrower; (v) maturity of the sub-projects (in particular only new sub-loans associated with greenfield subprojects will be eligible); (vi) technical and financial viability of the sub-projects; (vii) ability to assume financing commitments; (viii) environmental considerations, such as climate hazards; (ix) social and labor considerations; and (x) complying with social and environmental permits and regulations. Further details as well as eligibility and evaluation criteria and processes for the selection of sub-projects to be supported will be detailed in the POM, which will be subject to approval by the Bank. All beneficiary of sub-loans (either by PIAs or FBs) shall have private ownership.

55. **Selection criteria for FBs.** The lending from the facility must be transparent and open to be successful in scaling the DSPV market. To ensure an inclusive and transparent FBs selection process, a series of capacity buildings and outreach activities to promote the facility in the industry will also be carried out and supported by the Program (see relevant DLRs under DLI 3). Prospective FBs will need to meet a series of minimum criteria as follow: (i) being under the Banking Regulator’s supervision; (ii) not being under any sanction regime or financial restructuring plan; (iii) having policies that comply with local and international wrongdoing standards or meeting certain minimum risk ratings; (iv) sound financial performance considering standard prudential indicators; (v) existence of adequate business practices, including a credit policy, risk management policies, an investment policy, loan collection policies, business continuity, among others to ensure sound business practices; (vi) operational capacity (including the technical capacity to carry out an adequate appraisal and supervision of DER sub-projects’ technical, financial, and commercial aspects; adequate loan monitoring procedures and loan collection experience; and adequate Anti-Money Laundering/Know Your Customer policies and procedures); (vii) market-oriented governance; and (viii) adequate project pipeline and experience in infrastructure projects. Final criteria for the FBs will be included in the FOM and subject to World Bank validation.

56. **Pricing of PIA and Facility sub-loans.** To avoid market distortions, PIAs and FBs will follow their respective pricing policy according to credit market conditions. The funding provided by PIAs would be preferential (compared to commercial market rates), but fully covering PIAs costs. The cost of on-lending will include the cost of IBRD funds to PIAs plus an on-lending margin reflecting PIAs’ administrative costs, a credit risk margin (or risk markup) associated with market conditions and fees due accordingly to Türkiye banking regulations. The ultimate beneficiary cost will include the PIAs/FBs administrative costs, and a credit risk margin (or risk markup) associated with the market conditions and beneficiary enterprise. The only significant market advantage from the World Bank funds is in terms of maturity, facilitating the provision of long-term finance to enterprises without taking on a significant maturity mismatch. This is addressing a key failure in the DER market. The use of financing priced at cost, as described above, is justified by (i) the national and international public interest in promoting the use of green innovative technology at scale, given the substantial environmental benefits that it is expected to bring, (ii) the nascent stage of the DER industry, whereby first movers face higher initial risks and higher prices given the technology’s limited track record, and (iii) the importance of attracting private sector investments through public incentives from an early stage. By providing funding at preferential but cost-covering terms, the PIAs will enhance the industry as well as the financed sub-projects’ capacity to manage the incremental risks of the Program innovative approach.

57. **Removal of market barriers and capacity building for FBs.** The Program will also contribute to the removal of barriers to market development, through promotion of relevant regulatory changes by MENR and EMRA (see Program Action Plan). The IAs will be supported to build awareness and capacity in the market (that is, their own in-house capacity



as well as that of other stakeholders, especially FBs). The capacity-building support will strengthen the FBs’ ability in evaluating and appraising the technical aspects of these investments, and in turn meet the selection criteria listed above. As per the PforR, the IAs will be responsible for ensuring that the investments are in compliance with Turkish regulations.

58. **Expenditure framework.** The proposed Program expenditure is US\$930 million (see Table 4 below). The Program expenditures will occur when IAs disburse sub-loans directly or through FBs, which will be subject to their due diligence and approval processes (accordingly to the criteria listed above and in Annex 2, and to be further outlined in the facility operational manual which will be prepared, approved and validated by the World Bank under DLI 3). The World Bank carried out an assessment of the two PIAs’ FM and governance systems to identify the fiduciary risks of the DSPV program and propose appropriate mitigation measures. For details of eligible facility technologies and characteristics, see Annex 2.

Table 4. Program Expenditure Framework

Program Expenditure	Cost (US\$, millions)
Goods associated with eligible DER investments included in Annex 2 (including, inter alia, supply of PV panels, BESS, invertors, DC and AC cabling and distribution board, connector, mounting equipment (construction or tracker) transformer and switchgear, SCADA systems, meters, CCTV, grounding and lighting protection equipment)	728
Works associated with eligible DER investments included in Annex 2 (including, inter alia, installation of: PV panels, BESS, invertors, DC and AC cabling and distribution board, connector, mounting equipment (construction or tracker) transformer and switchgear, SCADA systems, meters, CCTV, grounding and lighting protection equipment)	182
Consulting services (including services associated with Independent Verification Agent, implementation of the PAP, setting up of the facility, engineering design, technical and financial feasibility study, obtaining necessary permits, commissioning and approval associated with eligible DER investments included in Annex 2)	20
TOTAL	930.0

59. **TSKB and TKYB capacity.** Both PIAs have high capacity, market reach, and a strong record in the delivery of sub-loans. However, they are still new to the DER market when it comes to assessing and financing these installations as well as coordinating key stakeholders, including the regulator. TSKB was established in 1950 with the support of the World Bank and the Central Bank of Turkey and shareholding of private commercial banks, and it is Türkiye’s first privately owned development and investment bank. TSKB provides corporate banking, investment banking, and consultancy services to its customers. TKYB is a well-established government-owned development bank. Both PIAs have extensive experience in the implementation of World Bank-financed projects, including in the RE sector.¹¹

60. **Results Framework.** The Results Framework is included in Annex 1. TSKB and TKYB will be responsible for results M&E as the borrowers and implementing agencies. Both have robust internal systems and processes to track expenditures and results according to their experience in other World Bank projects.

¹¹ Examples include Geothermal Development Project (P151739), Private Sector Renewable Energy and Energy Efficiency Project (P112578), Renewable Energy Project (P072480), Emergency Firm Support Project (P174112), Formal Employment Creation Project (P171766), Inclusive Access to Finance (P163225), and Innovative Access to Finance (P147183).



61. **Economic evaluation.** Since the specific investments are not known up front, an economic and financial analysis was performed on the three following representative investments: (a) ground-mounted solar PV in the industrial sector (15 MWp installed DC capacity), (b) rooftop solar PV in the MSME sector (8 kWp installed DC capacity), and (c) rooftop solar PV in the residential sector (1.2 kWp installed DC capacity). The results of the economic analysis in Table 5 confirm that all three representative investments are economically viable, even without CO₂ emission reduction benefits. Annex 2 provides further details about the assumptions and results of the analysis, including sensitivity and switching value analysis. About 74 percent of the economic benefits are from energy generated from the distributed RE installation, 2 percent from the associated reduction of local air pollutants, and 24 percent from the reduction of CO₂ emissions (in the case of using the low shadow price of carbon).

Table 5. Results of the Economic Analysis

	Ground-Mounted Solar PV, Industrial Sector	Rooftop Solar PV, MSME Sector	Rooftop Solar PV, Residential Sector
Economic analysis without CO ₂ emission reduction benefits			
Simple payback (years)	5.7	4.7	7.3
Economic internal rate of return (EIRR, percent)	16.3	20.0	12.1
Net present value (NPV, US\$)	11,282,058	7,695	596
Economic analysis with CO ₂ emission reduction benefits (low shadow price of carbon)			
Simple payback (years)	4.3	3.5	5.6
EIRR (percent)	22.2	26.7	17.1
NPV (US\$)	19,828,477	12,538	1,280
Economic analysis with CO ₂ emission reduction benefits (high shadow price of carbon)			
Simple payback (years)	3.5	2.9	4.5
EIRR (percent)	27.7	33.0	21.6
NPV (US\$)	28,347,015	17,365	1,961

62. **Financial analysis.** The entity that installs the distributed RE system will benefit from reduced electricity bills, according to the ‘unlicensed’ RE regulation scheme,¹² over the lifetime of the investment. The results of the financial analysis in Table 6 confirm that all three representative investments are financially viable. Further details are in annex 2.

Table 6. Results of the Financial Analysis

	Ground-Mounted Solar PV, Industrial Sector	Rooftop Solar PV, MSME Sector	Rooftop Solar PV, Residential Sector
Simple payback (years)	6.7	5.4	9.1
Financial internal rate of return (FIRR, percent)	14.5	18.7	9.5
NPV (US\$)	8,558,790	7,371	120

63. **BESS.** The World Bank carried out a comprehensive analysis to assess BESS economic and financial viability across the value chain, and explore the market potential. With the abovementioned regulatory changes, BESS can be used to participate in wholesale electricity markets and ancillary services markets, but it can also be used by grid operators without

¹² Under the ‘unlicensed’ RE regulation scheme, a customer can feed generated excess electricity into the grid and be compensated for the excess electricity at the retail tariff. Compensation stops when the excess electricity exceeds the customer’s consumption on an annual basis.



commercial purpose. Despite such regulatory changes, the analysis showed that the cost of BESS installation is still too high for its current use for peak shaving, behind-the-meter use to shift demand to off-peak hours, or as an alternative to grid investments. The analysis showed that switching values for BESS costs for such usages in the short to medium term is US\$200/MWh compared to the current cost in Türkiye of US\$450/MWh.

64. The current most promising value for BESS use is for frequency containment reserve in the ancillary services market given its fast and reliable frequency regulation and low-capacity requirement under Türkiye regulation. If the BESS installation is located in a congested location like Istanbul, it could potentially earn congestion payments or can be used by private DISCOs for system stabilization and resilience. Hybrid solutions focus on self-consumption, and resilience could also be considered in the C&I market.

65. The BESS analysis shows the need for concessional CTF funds to de-risk BESS investments and support innovative business models to pilot the financial viability of BESS in Türkiye. This in turn will inform new regulatory changes that will be needed to promote BESS. As of today, TKYB and TSKB have a limited number of potential BESS projects in their pipeline, which are on hold due to lack of financing and high perceived risks. Such projects would be able to absorb the envisaged CTF financing as part of the program. Project-specific technical, economic, and financial analysis and due diligence will be carried out for each such project by the IAs. Only technically, economically, and financially viable projects will be eligible under the Program.

Paris Alignment Paragraphs under Technical Analysis:

66. **This PforR operation is aligned with the goals of the Paris Agreement on both mitigation and adaptation.**
- (a) **Assessment and reduction of mitigation risk.** This PforR program is aligned with climate change mitigation goal. The activities eligible under this program actively contribute to decarbonization by reducing GHG emissions through RE. Both DSPV and BESS installations supported by this PforR Program are under the ‘universally aligned list’ based on the ‘Sector Toolkit for Applying the World Bank Group Paris Alignment Methods Energy and Extractives’. DSPV allows generating electricity from renewable sources and reduces fossil-fuel dependency. BESS installation under this PforR operation will also store electricity that is generated from RE. Other activities that do not involve physical investment activities under this PforR operation are also designed to support the expansion of the DSPV and BESS markets, thus further enhancing universally aligned activities.
 - (b) **Assessment and reduction of adaptation risk.** This PforR Program is aligned with the adaptation goal of the Paris Agreement. The risks from climate hazards for this PforR Program were determined by World Bank Climate and Disaster Risk Screening tool. Specific locations where DSPV and BESS technologies will be installed are still unknown, and the geographic scope in the screening is considered nationwide. Albeit location-specific, some subproject locations may be exposed to (i) extreme temperature (ii) extreme precipitation such as flooding and (iii) geophysical hazards (e.g., earthquake). The impact of extreme temperature is expected to be low (<5 percent) as the reduced performance of solar PV will be only subject to a few hours during a day in the hottest season (June–August) in Türkiye. To mitigate the vulnerability of the program to climate and geophysical hazards, the screening and eligibility criteria for sub-loans will exclude any DSPV and BESS sub-projects subject to high-risk of flooding and earthquake. Once these measures are incorporated, residual adaptation risk from climate hazards to this PforR Program will be reduced to an acceptable level and thus aligned with the adaptation goals of the Paris Agreement.



B. Fiduciary

67. TSKB and TKYB will lend to eligible private sector sub-borrowers. Practically all the procurement under the Program will be undertaken by the private sector sub-borrowers in accordance with established commercial practices. These are expected to include Goods, Works and Consultant Services related to DSPV and BESS systems. Goods may include but not limited to PV panels, invertors, DC and AC cabling and distribution board, connector, mounting equipment (construction or tracker) transformer and switchgear, SCADA systems, meters, CCTV, grounding and lighting protection equipment. Works may include but not limited to construction, mechanical and electrical works, switchyard and power transmission/distribution line works grounding and lighting protection system works, installation, logistics, commissioning and approval. Consultant Services may include but not limited to engineering design, technical and financial feasibility study, obtaining necessary permits, commissioning and approval. None of the expected contracts under the Program are expected to be “high value contracts” falling under the OPRC clearance thresholds¹³, which in case there are, these will not be eligible for financing under the Program.

68. With regard to the procurement to be undertaken by the private sector sub-borrowers, given the industry’s profit-driven nature and the highly competitive local market for works, goods, and services, the commercial practices and methods for procurement used in the private sector are fit for purpose and are deemed efficient and giving due attention to achieving value for money. The general process for private sector enterprises is to carry out a market analysis of available products/technologies/providers, and then through a series of negotiations establish long-term mutually beneficial relationships with the providers for obtaining the most advantageous prices. Many domestic private sector enterprises have purchasing departments that are subject to corporate internal controls. Audit and supervision departments in the enterprises also monitor expenditures.

69. There will be only very few procurements to be undertaken by the two PIAs themselves under the Program, which are expected to include hiring of consultants, such as the IVA for verification of achievement of DLIs, in accordance with the respective PIA’s procurement regulations. TSKB’s and TYKB’s procurement is not governed by the Public Procurement Law but by their respective corporate procurement regulations and operations manuals, except for Works contracts only in the case of TKYB (however there are no Works contracts expected to be procured by the PIAs themselves under the Program).

70. The Integrated Fiduciary System Assessment did not find significant gaps and risks in the commercial practices for financial management and procurement that will be applicable for the private sub borrowers under the Program. The assessment also found the existing FM and Procurement systems and performance of each of the two PIAs, TSKB and TYKB, to be adequate for handling the financial management and the few procurements to be undertaken by the PIAs themselves under the Program as well their capacity to oversee the financial management and procurement of the private-sector sub-borrowers under the Program.

71. However, some further strengthening measures for managing the moderate fiduciary risk have been provided in the Program Action Plan as summarized below:

- (i) TSKB and TYKB shall develop a mechanism and include it in the POM agreed by the Bank, outlining how the Bank’s debarment and suspension lists will be disseminated to the relevant private sector sub-borrowers and how such eligibility requirement will be reflected in the procurement processes, such as bid evaluation reports of the sub-borrowers to include certification that the contract is not being awarded to a firm and/or individual

¹³ OPRC clearance thresholds for moderate procurement risk (the current risk procurement rating of the Program, which may change during implementation) are *USD 115 million for Works; USD 75 million for Goods; and USD 30 million for Consultant Services or equivalent.*



in the Bank’s debarment and suspensions list. Compliance will be checked by the TSKB and TYKB and findings and actions taken to rectify any irregularities, if any, shall be made part of the overall reporting requirements as shall be further elaborated in the POM. Terms of Reference for the IVA may include appropriate tasks and responsibilities to also verify the compliance with the relevant commitment on sampling basis.

- (ii) PIAs shall develop/enhance the grievance mechanism to capture potential irregularities, which will be elaborated in the POM agreed with the Bank. PIAs shall report credible and material allegations of Fraud and Corruption (F&C) as part of overall reporting requirements on the Program to the Bank.
- (iii) PIAs shall ensure the Bank’s Anti-corruption Guidelines and Forced Labor commitments and declarations are applicable to the private sector sub-borrowers as well as to their suppliers, contractors, and consultants, by inclusion of the same in the procurement/contract documents, POM, and legal agreements with private sector sub-borrowers. Terms of Reference for the IVA may include appropriate tasks and responsibilities to also verify the compliance with the commitments on sampling basis.
- (iv) PIAs shall ensure the Bank’s right to investigate allegations and the related access to relevant persons are applicable to the private sector sub-borrowers as well as to their suppliers, contractors, and consultants, by inclusion of such commitment in the POM, procurement/contracts documents and legal agreements with private sector sub-borrowers.

72. Both PIAs will have FM responsibilities under the Program. The IBRD and CTF loans, as well as the ESMAP grant, will be disbursed directly into the accounts of the two PIAs upon the achievement of the associated DLIs and will be pooled with their own contributions to become the Program funds. The Program funds will be lent to borrowers based on the PIAs’ commercial assessments and the POM agreed with the World Bank. Each PIA’s accounting and financial reporting systems will be used to separately record and report on the Program activities. The two PIAs have a governance and internal control system in place, including internal and external audit. The Program will be included in the PIAs’ monitoring and control scopes. The Program-specific FM and disbursement arrangements will be documented in the POM agreed with the World Bank.

C. Environmental and Social

73. Overall, it is anticipated that the PforR Program shall have positive E&S impacts, such as reduction in local pollutants and GHG emissions, and improved access to RE sources. The Program shall contribute to strengthening the policy framework and institutional capacity of financial institutions (FIs) as well as EMRA. Overall, E&S risks and impacts associated with the Program were assessed as Moderate.

74. Rooftop and ground-mounted solar panels PV and BESS will have certain environmental adverse risks and impacts such as (a) waste management due to the construction/installation, maintenance, operation and decommissioning (disposal/recycling of not-in-use solar panels); (b) dust and noise due to construction/installation works; (c) sanitary wastewater management; (d) road/traffic safety considering construction vehicles and solar PV transportation; (e) occupational health and safety risks for workers engaged in construction/installation/operation works such as working with high voltages, electrical equipment, direct current, working at heights, heavy lifting, and potential fire/explosion and chemical hazards; (f) community health and safety risks during installation, operation, and disposal of not-in-use solar panels and other electric equipment needed for RSPV, ground-mounted solar PV, and BESS, and during construction of distribution lines, which may include potential fire/explosion, traffic safety, construction, and maintenance activities in and around the settlements; (g) resource use such as energy, water, and raw materials; and (h) land clearance for



installation of ground-mounted solar PV and BESS and for distribution lines to connect the ground-mounted solar PV with the distribution network.

75. Potential social risks and impacts include (a) potential need for land acquisition for installation of ground-mounted solar PV and BESS; (b) potential need to lease land for distribution lines poles installation (to connect the ground-mounted solar PV with the distribution network); (c) community health and safety risks during installation, operation, and disposal of RSPV, ground-mounted solar PV, and BESS and during distribution lines construction; and (d) contextual risks associated with child and forced labor risks in the supply chain of PVs, which will be addressed under the Program through requiring commitments & declarations in the procurement & contract documents regarding not using forced labor. Turkish laws prohibit forced labor. It is expected that the land will be acquired on a willing buyer, willing seller basis, with private entities (landowners and private companies) involved in these market-based transactions. Risks related to cultural heritage and biodiversity-sensitive areas impacts are not expected, because investments with such impacts will not be eligible for financing under this PforR. TKYB's and TSKB's Environmental and Social Management System (ESMS) will screen for such risks and impacts and eliminate them for Program eligibility. Overall, impacts caused by the activities under Results Areas 1 and 2 are likely to be limited, short term, and site specific and can be mitigated by applying national laws and requirements of TKYB's and TSKB's ESMS.

76. The E&S risks under the PforR are assess as Moderate. The Program design will aim to limit impacts, and the GoT and the Program implementing agencies have largely well-established and functional E&S regulatory and institutional frameworks in line with the core principles of the World Bank policies. Since the PforR instrument cannot finance any investments associated with high risk and adverse impacts, the eligibility criteria for financing in the POM specifically excludes this kind of investments. However, under Results Area 2, TSKB and TKYB will further on-lend to FBs to reach the untapped market segments. The POM will include clear eligibility criteria for FBs including a requirement for ESMS procedures and capacity to manage E&S risks and impacts. Selection process will be inclusive, transparent, and competitive for all interested commercial banks in Türkiye. The activities under Results area 2 including selection of FBs will start in the second phase of the Program.

77. The World Bank carried out an ESSA to assess the adequacy of the E&S systems of the FIs—TSKB and TKYB. The ESSA specifically assessed the E&S institutional and regulatory framework, and systems relevant to results areas under the Program, to effectively manage the above-identified E&S risks and adverse impacts. The ESSA also assessed TKYB's and TSKB's ESMSs.

78. The ESSA found that implementing agencies have adequate systems to manage E&S impacts of the Program. The legally binding Program Action Plan (PAP) serves to strengthen these existing systems, ensure regular E&S performance monitoring and staffing to support E&S risk management. The POM will include E&S exclusion criteria. To further strengthen outreach under the program, PIAs will seek feedback collection for selected subprojects to improve future subproject investments. The ESSA shall be disclosed before Program appraisal in Turkish and English languages and consulted upon. Internal and external stakeholder engagement and consultations took place throughout the ESSA preparation process. The Program will build on the experience of other similar World Bank-financed projects and use other relevant measures such as the POM to mainstream environmentally and socially friendly practices in the Program.

79. **Gender.** While Türkiye's Women's Financial Inclusion (WFI) progress is notable, an estimated 35 percent of women do not have bank accounts as of 2021. Social norms play an important role in influencing men's and women's attitudes toward WFI in Türkiye and in understanding some of the barriers faced. For example, there is a sense among men and women alike in some segments of society that women should not have financial independence, as defined by holding individual accounts in their own names. Furthermore, female entrepreneurs and already established women's



businesses in Türkiye also face significant financial obstacles. In an OECD entrepreneurship report on Türkiye, many more women than men said that access to finance represented a barrier to starting a business. Indeed, it is estimated that women-led SMEs in Türkiye face a US\$400 million financing gap. These statistics are concerning not just for the women business owners themselves but for the country, which could benefit from the economic value that thriving, non-financially constrained businesses can offer. Additionally, in Türkiye, collateral is required more often for women-led businesses than for businesses managed by a man. About 58 percent of loans to businesses led by women require collateral whereas only 38 percent of loans to businesses managed by men require collateral.

80. In response to these gender-based disparities in economic opportunities and access to finance, the Program will actively promote gender equality through the following analysis, actions and indicator. PIAs will organize outreach campaigns over the course of Program implementation to raise awareness on, gather information from, and build capacity of prospective and selected Sub-Project Borrowers and Facility Borrowers with respect to gender diversity, equality and inclusion. Through these campaigns, the PIAs will measure the following intermediate results indicator: 'Share of participating entities that have gender analysis, actions and indicators in place', with a target value of 100% at least 12 months before Program completion. This measures the share of all Program participant entities that have in place: (i) analysis to identify gender-related gaps within the entity's scope of corporate responsibility; (ii) an action plan to specifically address gender gaps as identified in the analysis; and (iii) indicator(s) to define the outcomes expected to be achieved through the actions. To recognize partial progress in the aggregate result value for the Program, those participating entities with only one or two of the three elements will count as one-third or two-thirds respectively. Program participating entities to which this indicator applies include: PIAs themselves; FBs; Sub-Project Borrowers; and any consulting firm(s) engaged by the PIAs to assist with Program implementation. The indicator will be monitored through progress implementation reports prepared by PIAs based on data collected by the PIAs themselves (with or without the assistance of a consulting firm) in accordance with details defined in the Program Operation Manual.

81. **GHG accounting.** To calculate the net GHG emissions of the Program, the total installed capacity of DSPV and BESS are first determined based on the unit costs of technologies and financing amount per technology (DSPV per each market segment and BESS). Based on the installed capacity, the total amount of avoided grid electricity for 20 years of DSPV was calculated by electricity generation from DSPV minus electricity charged to BESS plus electricity discharged from BESS. Given the difference in life years between DSPV (20 years) and lithium-ion battery (10 years), it was assumed that each battery would be replaced with a new one with the same capacity at the end of 10 years of its installation. Then, the baseline emission was calculated using the total avoided grid electricity using the latest Combined Margin (CM) factor for solar and wind, published by MENR in September 2022, which is 0.6488 tCO₂eq/MWh. Net GHG emissions are calculated as the difference between project and baseline emissions, resulting in 14.2 million tCO₂.¹⁴

82. **Grievance Redress.** Communities and individuals who believe that they are adversely affected as a result of a Bank supported PforR operation, as defined by the applicable policy and procedures, may submit complaints to the existing program grievance mechanism or the Bank's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed in order to address pertinent concerns. Project affected communities and individuals may submit their complaint to the Bank's independent Accountability Mechanism (AM). The AM houses the Inspection Panel, which determines whether harm occurred, or could occur, as a result of Bank non-compliance with its policies and procedures, and the Dispute Resolution Service, which provides communities and borrowers with the opportunity to address

¹⁴ According to the 'World Bank's Guidance Manual: Greenhouse gas Accounting for Energy Investment Operations', accounting lifetime emissions, including upstream and downstream emissions, is not required (that is, the default emissions factor for solar PV is 0). To take a more conservative approach, this Program considered the lifetime emission for DSPV and BESS. The Program emissions are the sum of DSPV generation multiplied by the lifetime emission factor for solar PV (0.043 gCO₂eq/MWh) and BESS electricity discharged multiplied by twice the lifetime emission factor for lithium-ion battery (0.0354 gCO₂eq/MWh), considering additional battery replacement requirement in the lifetime of DSPV (20 years).



complaints through dispute resolution. Complaints may be submitted at any time after concerns have been brought directly to the Bank's attention, and Bank Management has been given an opportunity to respond. For information on how to submit complaints to the Bank's Grievance Redress Service (GRS), visit <https://www.worldbank.org/GRS>. For information on how to submit complaints to the Bank's Accountability Mechanism, visit <https://accountability.worldbank.org>.

V. RISK

83. **The overall risk rating of the proposed operation is considered Moderate.**

Table 7. Risk Ratings

Risk Category	Rating
1. Political and Governance	Moderate
2. Macroeconomic	Substantial
3. Sector Strategies and Policies	Moderate
4. Technical Design of Project or Program	Moderate
5. Institutional Capacity for Implementation and Sustainability	Moderate
6. Fiduciary	Moderate
7. Environment and Social	Moderate
8. Stakeholders	Moderate
Overall	Moderate

84. **Macroeconomic risk is considered substantial.** Key macroeconomic risks to the project include (a) any further significant depreciation of the currency and high inflation could raise the construction cost and foreign exchange risk faced by project developers; (b) supply-side constraints due to a spike in imported intermediate goods and equipment price and as a result of the elevated pricing uncertainty could lead to delays in project implementation; and (c) further currency depreciation could affect foreign exchange risks of utilities of metropolitan municipalities putting pressure on their budget and lead to debt service problems. The ongoing war in Ukraine and other geopolitical tension in the region have adversely affected commodity and energy prices and caused a slowdown in the EU and other major markets. The World Bank will also continue to monitor macro-financial risk, engage with the authorities on economic policies, and offer technical assistance as requested by the Government.



ANNEX 1. RESULTS FRAMEWORK MATRIX

Program Development Objective(s)

To expand Türkiye’s distributed solar photovoltaic market and pilot distributed battery electricity storage.

PDO Indicators by Outcomes

Baseline	Closing Period
Expand Türkiye’s DSPV market and pilot distributed battery electricity storage.	
Renewable energy generation capacity enabled (Megawatt)	
Dec/2023	Mar/2029
0.00	878
Distributed energy financiers supported (Number)	
Dec/2023	Mar/2029
0	5
Private capital mobilized (Amount(USD))	
Dec/2023	Mar/2029
0	240000000
Distributed BESS piloted (Yes/No)	
Dec/2023	Mar/2029
No	Yes
Greenhouse gas emissions from imported fossil gas avoided (Metric ton)	
Dec/2023	Mar/2029
0.00	14200000

Intermediate Indicators by Results Areas



Baseline	Period 1	Period 2	Period 3	Period 4	Period 5	Closing Period
Results Area 1 - Scaling up distributed solar photovoltaic (DSPV)						
Program Implementing Agencies (PIAs) sub-loans for distributed solar photovoltaic (DSPV) (Amount(USD))^{DLI}						
Dec/2023	Dec/2024	Dec/2025	Dec/2026	Dec/2027	Dec/2028	Mar/2029
0	215200000	538000000	538000000	538000000	538000000	538000000
➤ TSKB sub-loans for DSPV (Amount(USD)) ^{DLI}						
Dec/2023	Dec/2024	Dec/2025	Dec/2026	Dec/2027	Dec/2028	Mar/2029
0.00	107600000	269000000	269000000	269000000	269000000	269000000
➤ TKYB sub-loans for DSPV (Amount(USD)) ^{DLI}						
Dec/2023	Dec/2024	Dec/2025	Dec/2026	Dec/2027	Dec/2028	Mar/2029
0.00	107600000	269000000	269000000	269000000	269000000	269000000
Generation capacity under PIAs sub-loans (Megawatt)^{DLI}						
Dec/2023	Dec/2024	Dec/2025	Dec/2026	Dec/2027	Dec/2028	Dec/2028
0.00	0	253.6	634	634	634	634
➤ Generation capacity under TSKB sub-loans (Megawatt) ^{DLI}						
Dec/2023	Dec/2024	Dec/2025	Dec/2026	Dec/2027	Dec/2028	Dec/2028
0.00	0	126.80	317	317	317	317
➤ Generation capacity under TKYB sub-loans (Megawatt) ^{DLI}						
Dec/2023	Dec/2024	Dec/2025	Dec/2026	Dec/2027	Dec/2028	Dec/2028
0.00	0	126.80	317	317	317	317
Results Area 2 -Expanding the market and promoting innovation for distributed energy						
DSPV on-lending facility in place (Text)^{DLI}						
Dec/2023	Dec/2024	Dec/2025	Dec/2026	Dec/2027	Dec/2028	Mar/2029
DLRs a,b,c,d not met	DLR a met; DLRs b,c,d not met	DLRs a,b,c,d met	DLRs a,b,c,d met	DLRs a,b,c,d met	DLRs a,b,c,d, met	DLRs a,b,c,d, met
Facility sub-loans by PIAs (Amount(USD))^{DLI}						
Dec/2023	Dec/2024	Dec/2025	Dec/2026	Dec/2027	Dec/2028	Mar/2029
0	0	0	87200000	218000000	218000000	218000000
➤ Facility sub-loans by TSKB (Amount(USD)) ^{DLI}						
Dec/2023	Dec/2024	Dec/2025	Dec/2026	Dec/2027	Dec/2028	Dec/2028
0.00	0	0	43600000	109000000	109000000	109000000
➤ Facility sub-loans by TKYB (Amount(USD)) ^{DLI}						
Dec/2023	Dec/2024	Dec/2025	Dec/2026	Dec/2027	Dec/2028	Dec/2028
0.00	0	0	43600000	109000000	109000000	109000000
Generation capacity under facility sub-loans (Megawatt)^{DLI}						



Dec/2023	Dec/2024	Dec/2025	Dec/2026	Dec/2027	Dec/2028	Mar/2029
0	0	0	0	97.6	244	244
➤ Generation capacity under facility sub-loans by TSKB (Megawatt) ^{DLI}						
Dec/2023	Dec/2024	Dec/2025	Dec/2026	Dec/2027	Dec/2028	Mar/2029
0	0	0	0	48.8	122	122
➤ Generation capacity under facility sub-loans by TKYB (Megawatt) ^{DLI}						
Dec/2023	Dec/2024	Dec/2025	Dec/2026	Dec/2027	Dec/2028	Mar/2029
0	0	0	0	48.8	122	122
PIAs sub-loans for battery energy storage system (BESS) [CTF] (Amount(USD)) ^{DLI}						
Dec/2023	Dec/2024	Dec/2025	Dec/2026	Dec/2027	Dec/2028	Dec/2028
0	6	21	30	30	30	30
➤ TSKB sub-loans for BESS [CTF] (Amount(USD)) ^{DLI}						
Dec/2023	Dec/2024	Dec/2025	Dec/2026	Dec/2027	Dec/2028	Dec/2028
0	3	10.5	15	15	15	15
➤ TKYB sub-loans for BESS [CTF] (Amount(USD)) ^{DLI}						
Dec/2023	Dec/2024	Dec/2025	Dec/2026	Dec/2027	Dec/2028	Dec/2028
0	3	10.5	15	15	15	15
BESS capacity under PIAs sub-loans [CTF] (Megawatt hour(MWh)) ^{DLI}						
Dec/2023	Dec/2024	Dec/2025	Dec/2026	Dec/2027	Dec/2028	Dec/2028
0	0	12.8	44.8	64	64	64
➤ BESS capacity under TSKB sub-loans [CTF] (Megawatt hour(MWh)) ^{DLI}						
Dec/2023	Dec/2024	Dec/2025	Dec/2026	Dec/2027	Dec/2028	Mar/2029
0.00	0	6.4	22.4	32	32	32
➤ BESS capacity under TKYB sub-loans [CTF] (Megawatt hour(MWh)) ^{DLI}						
Dec/2023	Dec/2024	Dec/2025	Dec/2026	Dec/2027	Dec/2028	Mar/2029
0.00	0	6.4	22.4	32	32	32
Other intermediate indicators						
Strategic plan for decarbonization of energy sector in place (Text)						
Dec/2023						Mar/2029
Not published						Strategic Energy Plan 2024-2028 published
Changes introduced in regulatory framework to allow participation of third-party energy supply aggregators in the market (Text)						
Dec/2023						Mar/2029
Not completed						EMRA by-laws enacted
Share of participating entities that have gender analysis, action and indicators in place (Percentage)						
Dec/2023						Mar/2029



0							100
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Disbursement Linked Indicators (DLI)

Period	Period Definition	Timeline
Period 0	Prior Results	2023
Period 1	Year1	2024
Period 2	Year2	2025
Period 3	Year3	2026
Period 4	Year4	2027
Period 5	Year5	2028
Period 6	Year6	2029

Baseline	Period 0	Period 1	Period 2	Period 3	Period 4	Period 5	Period 6
1 : Program Implementing Agencies (PIAs) sub-loans for distributed solar photovoltaic (DSPV) (Amount(USD))							
0.00	0	215200000	322800000	0	0	0	0
0.00	0.00	116,000,116.80	174,000,175.20	0.00	0.00	0.00	0.00
DLI allocation		290,000,292.00		As a % of Total Financing Amount		48.33%	
> 1.1 : TSKB sub-loans for DSPV (Amount(USD))							
0.00	0	107600000	161400000	0	0	0	0
0.00	0.00	58,000,058.40	87,000,087.60	0.00	0.00	0.00	0.00
DLI allocation		145,000,146.00		As a % of Total Financing Amount		24.17%	
> 1.2 : TKYB sub-loans for DSPV (Amount(USD))							
0.00	0	107600000	161400000	0	0	0	0
0.00	0.00	58,000,058.40	87,000,087.60	0.00	0.00	0.00	0.00
DLI allocation		145,000,146.00		As a % of Total Financing Amount		24.17%	
2 : Generation capacity under PIAs sub-loans (Megawatt)							
0.00	0	0	253.60	380.40	0	0	0
0.00	0.00	0.00	45,000,052.00	67,500,078.00	0.00	0.00	0.00



DLI allocation		112,500,130.00		As a % of Total Financing Amount		18.75%	
➤ 2.1 : Generation capacity under TSKB sub-loans (Megawatt)							
0.00	0	0	126.8	190.2	0	0	0
0.00	0.00	0.00	22,500,026.00	33,750,039.00	0.00	0.00	0.00
DLI allocation		56,250,065.00		As a % of Total Financing Amount		9.38%	
➤ 2.2 : Generation capacity under TKYB sub-loans (Megawatt)							
0.00	0	0	126.80	190.20	0	0	0
0.00	0.00	0.00	22,500,026.00	33,750,039.00	0.00	0.00	0.00
DLI allocation		56,250,065.00		As a % of Total Financing Amount		9.38%	
3 : DSPV on-lending facility in place (Text)							
DLRs a,b,c,d not met	NA	DLR a met	DRLs b, c, d met	NA	NA	NA	0
0.00	0.00	6,374,471,000.00	25,500,000.00	0.00	0.00	0.00	0.00
DLI allocation		25,497,884.00		As a % of Total Financing Amount		4.25%	
4 : Facility sub-loans by PIAs (Amount(USD))							
0.00	0	0	0	87200000	130800000	0	0
0.00	0.00	0.00	0.00	52,000,586.40	78,000,879.60	0.00	0.00
DLI allocation		130,001,466.00		As a % of Total Financing Amount		21.67%	
➤ 4.1 : Facility sub-loans by TSKB (Amount(USD))							
0.00	0	0	0	43600000	65400000	0	0
0.00	0.00	0.00	0.00	26,000,293.20	39,000,439.80	0.00	0.00
DLI allocation		65,000,733.00		As a % of Total Financing Amount		10.83%	
➤ 4.2 : Facility sub-loans by TKYB (Amount(USD))							
0.00	0	0	0	43600000	65400000	0	0
0.00	0.00	0.00	0.00	26,000,293.20	-39,000,439.80	0.00	0.00
DLI allocation		65,000,733.00		As a % of Total Financing Amount		10.83%	
5 : Generation capacity under facility sub-loans (Megawatt)							
0	0	0	0	0	97.6	146.40	0
0.00	0.00	0.00	0.00	0.00	18,000,075.20	27,000,112.80	0.00
DLI allocation		45,000,188.00		As a % of Total Financing Amount		7.5%	
➤ 5.1 : Generation capacity under facility sub-loans by TSKB (Megawatt)							
0	0	0	0	0	48.8	73.2	0



0.00	0.00	0.00	0.00	0.00	9,000,037.60	13,500,056.40	0.00
DLI allocation		22.50		As a % of Total Financing Amount		3.75%	
➤ 5.2 : Generation capacity under facility sub-loans by TKYB (Megawatt)							
0	0	0	0	0	48.8	73.2	0
0.00	0.00	0.00	0.00	0.00	9,000,037.60	13,500,056.40	0.00
DLI allocation		22,500,094.00		As a % of Total Financing Amount		3.75%	
6 : PIAs sub-loans for battery energy storage system (BESS) [CTF] (Amount(USD))							
TBD	0	6000000	15000000	9000000	0	0	0
0.00	0.00	4,000,008.00	10,000,020.00	6,000,012.00	0.00	0.00	0.00
DLI allocation		20,000,040.00		As a % of Total Financing Amount		3.33%	
➤ 6.1 : TSKB sub-loans for BESS [CTF] (Amount(USD))							
TBD	0	3000000	7500000	4500000	0	0	0
0.00	0.00	2,000,004.00	5,000,006.00	3,000,006.00	0.00	0.00	0.00
DLI allocation		10,000,020.00		As a % of Total Financing Amount		1.67%	
➤ 6.2 : TKYB sub-loans for BESS [CTF] (Amount(USD))							
TBD	0	3000000	7500000	4500000	0	0	0
0.00	0.00	20,000,004.00	50,000,010.00	3,000,006.00	0.00	0.00	0.00
DLI allocation		10,000,020.00		As a % of Total Financing Amount		1.67%	
7 : BESS capacity under PIAs sub-loans [CTF] (Megawatt hour(MWh))							
0.00	0	0	12.8	32	19.20	0	0
0.00	0.00	0.00	2,000,000.00	5,000,000.00	3,000,000.00	0.00	0.00
DLI allocation		10,000,000.00		As a % of Total Financing Amount		1.67%	
➤ 7.1 : BESS capacity under TSKB sub-loans [CTF] (Megawatt hour(MWh))							
0.00	0	0	6.4	16	9.6	0	0
0.00	0.00	0.00	1,000,000.00	2,500,000.00	1,500,000.00	0.00	0.00
DLI allocation		5,000,000.00		As a % of Total Financing Amount		0.83%	
➤ 7.2 : BESS capacity under TKYB sub-loans [CTF] (Megawatt hour(MWh))							
0.00	0	0	6.4	16	9.6	0	0
0.00	0.00	0.00	1,000,000.00	2,500,000.00	1,500,000.00	0.00	0.00
DLI allocation		5,000,000.00		As a % of Total Financing Amount		0.83%	





Monitoring & Evaluation Plan: PDO Indicators by PDO Outcomes

Expand Türkiye’s DSPV market and pilot distributed battery electricity storage	
Renewable energy generation capacity enabled (Megawatt)	
Description	This indicator measures the cumulative generation capacity of DSPV installed under sub-loans by PIA and facility subloans.
Frequency	Semi-annual
Data source	Reports from TSKB and TKYB
Methodology for Data Collection	TSKB and TKYB will monitor the cumulative generation capacity of DSPV installed under sub-loans and facility sub-loans based on the acceptance letter by the distribution company.
Responsibility for Data Collection	TSKB and TKYB
Distributed energy financiers supported (Number)	
Description	This indicator measures the number of distributed energy financiers supported under this program who participated in the facility for DSPV
Frequency	Annual
Data source	Reports from TSKB and TKYB
Methodology for Data Collection	Number of Distributed energy financiers who sign with TSKB and TKYB to participate facility will be counted.
Responsibility for Data Collection	TSKB andTKYB
Private capital mobilized (Amount (USD))	
Description	This indicator measures the amount of private capital mobilized by the program, which includes co-financing by PIA and commercial banks and equity contribution by beneficiaries for DSPV and BESS investments.
Frequency	Semi-annual
Data source	Reports from TSKB and TKYB
Methodology for Data Collection	TSKB and TKYB will track their co-financing amount as well as co-financing from commercial banks and equity contribution by beneficiaries for DSPV and BESS investments.
Responsibility for Data Collection	TSKB and TKYB
Distributed BESS piloted (Yes/No)	
Description	This indicator measure whether the program enables distributed BESS pilot by installation and operationalization of distributed BESS financed by TSKB and TKYB under the Program and benefit demonstrated.
Frequency	Semi-annual
Data source	Reports from TSKB and TKYB
Methodology for Data Collection	Implementation of BESS subprojects
Responsibility for Data Collection	TSKB and TKYB
Greenhouse gas emissions from imported fossil gas avoided (Metric ton)	
Description	This indicator measures progress towards total avoided greenhouse gas emission resulting from installed distributed solar PV and battery energy storage
Frequency	Semi-annual
Data source	Reports from TSKB and TKYB
Methodology for Data Collection	Calculated per the World Bank GHG accounting guideline using the average electricity generation from installed renewable energy under the program and grid emission factor in Turkiye
Responsibility for Data Collection	TSKB and TKYB



Monitoring & Evaluation Plan: Intermediate Results Indicators by Results Areas

Results Area 1 - Scaling up distributed solar photovoltaic (DSPV)	
Program Implementing Agencies (PIAs) sub-loans for distributed solar photovoltaic (DSPV) (Amount(USD))^{DLI}	
Description	This indicator measures the cumulative monetary amount of sub-loans for DSPV made to sub-project borrowers by two PIAs, TSKB and TKYB. This indicator has two breakdown sub-indicators each of which represents sub-loans amount by TSKB and TKYB, respectively.
Frequency	Semi-annual
Data source	TSKB and TKYB reports
Methodology for Data Collection	TSKB and TKYB will monitor the cumulative amount of sub-loans, and disbursed amount to sub-borrowers for eligible DSPV sub-projects in line with eligibility criteria and relevant data described in the Program Operational Manual (POM). This indicator will be verified by the Independent Verification Agent (IVA) for selected samples of sub-loans for disbursement
Responsibility for Data Collection	TSKB and TKYB
➤ TSKB sub-loans for DSPV (Amount(USD))^{DLI}	
Description	This is a breakdown sub-indicator to measure the amount of sub-loans by TSKB. See the description of the parent indicator.
Frequency	Semi-annual
Data source	TSKB reports
Methodology for Data Collection	Refer to parent indicator
Responsibility for Data Collection	TSKB
➤ TKYB sub-loans for DSPV (Amount(USD))^{DLI}	
Description	This is a breakdown sub-indicator to measure the amount of sub-loans by TKYB. See the description of the parent indicator.
Frequency	Semi-annual
Data source	TKYB reports
Methodology for Data Collection	Refer to parent indicator
Responsibility for Data Collection	TKYB
Generation capacity under PIAs sub-loans (Megawatt)^{DLI}	
Description	This indicator measures the cumulative amounts of DSPV electric power generation capacity made to sub-project borrowers by TSKB and TKYB. This indicator has two breakdown sub-indicators each of which represents generation capacity of sub-projects by TSKB and TKYB, respectively.
Frequency	Semi-annual
Data source	Reports from TSKB and TKYB
Methodology for Data Collection	TSKB and TKYB will monitor the capacity of DSPV sub-projects that has been installed and are operational based on the acceptance letter by the distribution company. This indicator will be verified by the IVA for selected sample of sub-loans for disbursement.
Responsibility for Data Collection	TSKB and TKYB
➤ Generation capacity under TSKB sub-loans (Megawatt)^{DLI}	
Description	This is a breakdown sub-indicator to measures the cumulative amounts of DSPV generation capacity of subprojects by TSKB. See the description of the parent indicator



Frequency	Semi-annual
Data source	TSKB reports
Methodology for Data Collection	Refer to the parent indicator
Responsibility for Data Collection	TSKB
➤ Generation capacity under TKYB sub-loans (Megawatt) ^{DLI}	
Description	This is a breakdown sub-indicator to measures the cumulative amounts of DSPV generation capacity of subprojects by by TKYB. See the description of the parent indicator
Frequency	Semi-annual
Data source	TKYB reports
Methodology for Data Collection	Refer to the parent indicator
Results Area 2 - Expanding the market and promoting innovation for distributed energy	Results Area 2 -Expanding the market and promoting innovation for distributed energy
Results Area 2 -Expanding the market and promoting innovation for distributed energy	
DSPV on-lending facility in place (Text) ^{DLI}	
Description	Establishment of a transparent and inclusive facility by the PIAs (TSKB and TKYB) through which they finance Facility Borrowers (FBs), such as commercial banks and leasing companies, to on-lend to sub-project borrowers for DSPV investments.
Frequency	Annual
Data source	TSKB and TKYB reports
Methodology for Data Collection	TSKB and TKYB will submit (a) definition of transparent and inclusive criteria for FB participation and for sub-project selection, acceptable to IBRD; (b) finalization of Facility Operational Manual (FOM) acceptable to IBRD, including role of PIAs in terms of due diligence, fiduciary and safeguards requirements, and rules of disbursement from signing to commissioning; (c) documentary evidence of awareness and capacity building conducted as defined in the PAP for groups of potential FBs; and (d) first three sub-loan agreements with FBs signed.
Responsibility for Data Collection	TSKB and TKYB
Facility sub-loans by PIAs (Amount(USD)) ^{DLI}	
Description	Description
Frequency	Frequency
Data source	Data source
Methodology for Data Collection	Methodology for Data Collection
Responsibility for Data Collection	Responsibility for Data Collection
Facility sub-loans by TSKB (Amount(USD)) ^{DLI}	
Description	This is a breakdown sub-indicator to measure the amount of sub-loans by FBs through funds on-lent by TSKB. See the description of the parent indicator.
Frequency	Semi-annual
Data source	TSKB reports
Methodology for Data Collection	Refer to the parent indicator
Responsibility for Data Collection	TSKB
Facility sub-loans by TKYB (Amount(USD)) ^{DLI}	



Description	This is a breakdown sub-indicator to measure the amount of sub-loans by FBs through funds on-lent by TKYB. See the description of the parent indicator.
Frequency	Semi-annual
Data source	TKYB reports
Methodology for Data Collection	Refer to the parent indicator
Responsibility for Data Collection	TKYB
Generation capacity under facility sub-loans (Megawatt) ^{DLI}	
Description	This indicator measures the cumulative amounts of DSPV generation capacity made to sub-project borrowers by the FBs through funds on-lent by the PIAs on-lent by the PIAs, TSKB and TKYB. This indicator has two breakdown sub-indicators each of which represents DSPV generation capacity of sub-projects by FBs through TSKB and TKYB, respectively.
Frequency	Semi-annual
Data source	Reports from TSKB and TKYB
Methodology for Data Collection	TSKB and TKYB will monitor the capacity of DSPV sub-projects that has been installed and are operational based on the acceptance letter by the distribution company. This indicator will be verified by the IVA for selected sample of sub-loans for disbursement.
Responsibility for Data Collection	TSKB and TKYB
➤ Generation capacity under facility sub-loans by TSKB (Megawatt) ^{DLI}	
Description	This is a breakdown sub-indicator to measure the cumulative amounts of DSPV generation capacity made to sub-project borrowers by the FBs through funds on-lent by TSKB
Frequency	Semi-annual
Data source	TSKB reports
Methodology for Data Collection	Refers to the parent indicator
Responsibility for Data Collection	TSKB
➤ Generation capacity under facility sub-loans by TKYB (Megawatt) ^{DLI}	
Description	This is a breakdown sub-indicator to measure the cumulative amounts of DSPV generation capacity made to sub-project borrowers by the FBs through funds on-lent by TSKB
Frequency	Semi-annual
Data source	TKYB reports
Methodology for Data Collection	Refers to the parent indicator
Responsibility for Data Collection	TKYB
PIAs sub-loans for battery energy storage system (BESS) [CTF] (Amount(USD)) ^{DLI}	
Description	This indicator measures cumulative monetary amounts of sub-loans for BESS made to sub-project borrowers by two PIAs, namely TSKB and TKYB. This indicator has two breakdown sub-indicators each of which represents sub-loans amount by TSKB and TKYB, respectively.
Frequency	Semi-annual
Data source	Reports from TSKB and TKYB
Methodology for Data Collection	TSKB and TKYB will monitor the cumulative amount of sub-loans and disbursed amount for BESS sub-projects in line with the eligibility criteria and relevant data described in the POM. This indicator will be verified by the IVA for selected sample of sub-loans for disbursement.
Responsibility for Data Collection	TSKB and TKYB
➤ TSKB sub-loans for BESS [CTF] (Amount(USD)) ^{DLI}	



Description	This is a breakdown sub-indicator that measures cumulative monetary amounts of sub-loans for BESS made to sub-project borrowers by TSKB
Frequency	Semi-annual
Data source	TSKB reports
Methodology for Data Collection	Refers to the parent indicator
Responsibility for Data Collection	TSKB
➤ TKYB sub-loans for BESS [CTF] (Amount(USD))^{DLI}	
Description	This is a breakdown sub-indicator that measures cumulative monetary amounts of sub-loans for BESS made to sub-project borrowers by TKYB
Frequency	Semi-annual
Data source	TKYB reports
Methodology for Data Collection	Refers to the parent indicator.
Responsibility for Data Collection	TKYB
BESS capacity under PIAs sub-loans [CTF] (Megawatt hour(MWh))^{DLI}	
Description	This indicators measures the cumulative amounts of BESS capacity made to sub-project brrowers by TSKB and TKYB.
Frequency	Semi-annual
Data source	Reports from TSKB and TKYB
Methodology for Data Collection	TSKB and TKYB will monitor the capacity of the BESS sub-projects that has been installed and comissioned based on the acceptance report. This indicator will be verified by the IVA for selected sample of sub-loans for disbursement.
Responsibility for Data Collection	TSKB and TKYB
➤ BESS capacity under TSKB sub-loans (Megawatt hour(MWh))^{DLI}	
Description	This is a breakdown sub-indicator that measures the cumulative amounts of BESS capacity of eligible subprojects by TSKB.
Frequency	Semi-annual
Data source	TSKB reports
Methodology for Data Collection	Refers to the parent indicator
Responsibility for Data Collection	TSKB
➤ BESS capacity under TKYB sub-loans (Megawatt hour(MWh))^{DLI}	
Description	This is a breakdown sub-indicator that measures the cumulative amounts of BESS capacity of eligible subprojects by TKYB.
Frequency	Semi-annual
Data source	TKYB reports
Methodology for Data Collection	Refer to the parent indicator
Responsibility for Data Collection	TKYB
Strategic plan for decarbonization of energy sector in place (Text)	
Description	Strategic plan for decarbonization of energy sector in place with policy direction, including near-term targets, to reduce the intensity of annual GHG emissions per volume of electricity generated broadly consistent with a trajectory toward zero by 2053.
Frequency	Annual
Data source	Documentary evidence



Methodology for Data Collection	Strategic Energy Plan 2024-2028 is formally published
Responsibility for Data Collection	MENR
Changes introduced in regulatory framework to allow participation of third-party energy supply aggregators in the market (Text)	
Description	Amendment of Türkiye’s energy market by-law is made to provide for aggregation of distributed energy resources
Frequency	Annual
Data source	Documentary evidence
Methodology for Data Collection	EMRA amends by-laws and/or regulations to fully provide for aggregation of supply-side and demand-side distributed energy resources, building on recent amendment of the Energy Market Law
Responsibility for Data Collection	EMRA
Share of participating entities that have gender analysis, action and indicators in place	
Description	This indicator measures percentage of participating entities that have gender analysis, action and indicators in place to address gender gap. Program participating entities to which this indicator applies include: PIAs themselves; FBs; Sub-Project Borrowers; and any consulting firm(s) engaged by the PIAs to assist with Program implementation.
Frequency	Semi-Annual
Data source	TSKB and TKYB
Methodology for Data Collection	TSKB and TKYB will monitor their own and also participating entities’ gender analysis, action and indicator status as part of monitoring implementation in accordance with details defined in the Program Operation Manual.
Responsibility for Data Collection	TSKB and TKYB



Verification Protocol Table: Disbursement Linked Indicators

1 : PIA sub-loans for DSPV (Amount(USD))	
Formula	Refer to sub-DLIs
Description	This is a parent DLI that displays the cumulative monetary amounts of sub-loans for distributed solar photovoltaics (DSPV) made to sub-project borrowers by the Program Implementing Agencies (PIAs), namely TSKB and TKYB, as captured in DLI 1.1 and 1.2 respectively. It does not represent a true DLI that disburses against an achievement. See PAD body for list of eligible investments. (For investments involving battery energy storage, see DLI 6 and 7).
Data source/ Agency	Refer to sub-DLIs
Verification Entity	Refer to sub-DLIs
Procedure	Refer to sub-DLIs
1.1 : TSKB sub-loans for DSPV (Amount(USD))	
Formula	269,517 USD per USD million of sub-loan amount for each of DLR (a) and DLR (b)
Description	Sub-loans, as described in DLI 1, made by TSKB. The DLRs are: (a) signing by TSKB of sub-loan agreement with sub-project borrower; and (b) disbursement by TSKB to sub-project borrower of at least 50%.
Data source/ Agency	TSKB reports
Verification Entity	Independent Verification Agent (IVA)
Procedure	The IVA will verify, based on the report submitted by TSKB, the number of sub-loan agreements signed and disbursements to sub-projects against the eligibility criteria and relevant data described in the Program Operational Manual (POM) such as sub-project borrower name, loan amount, and disbursed and undisbursed amounts. The IVA will verify a small representative sample of these sub-loans, including through field visits.
1.2 : TKYB sub-loans for DSPV (Amount(USD))	
Formula	269,517 USD per USD million of sub-loan amount for each of DLR (a) and DLR (b)
Description	Sub-loans, as described in DLI 1, made by TKYB. The DLRs are: (a) signing by TKYB of sub-loan agreement with sub-project borrower; and (b) disbursement by TKYB to sub-project borrower of at least 50%.
Data source/ Agency	TKYB reports
Verification Entity	Independent Verification Agent (IVA)
Procedure	The IVA will verify, based on the report submitted by TKYB, the number of sub-loan agreements signed and disbursements to sub-projects against the eligibility criteria and relevant data described in the Program Operational Manual (POM) such as sub-project borrower name, loan amount, and disbursed and undisbursed amounts. The IVA will verify a small representative sample of these sub-loans, including through field visits.
2 : Generation capacity under PIA sub-loans (Megawatt)	
Formula	Refer to sub-DLIs
Description	This is a parent DLI that displays the cumulative amounts of distributed solar photovoltaic electric power generation capacity made to sub-project borrowers by TSKB and TKYB under DLI 2.1 and 2.2 respectively. It does not represent a true DLI that disburses against an achievement.
Data source/ Agency	Refer to sub-DLIs
Verification Entity	Refer to sub-DLIs
Procedure	Refer to sub-DLIs
2.1 : Generation capacity under TSKB sub-loans (Megawatt)	
Formula	177,445 USD per MW
Description	Power generation capacity as described in DLI 2, under sub-loans by TSKB.
Data source/ Agency	TSKB reports
Verification Entity	IVA



Procedure	The IVA will verify, based on the report submitted by TSKB including documents described in the POM, such as the acceptance letter by the distribution company, that the capacity of sub-projects has been installed and are operational. The IVA will verify a small representative sample of these sub-loans, including through field visits.
2.2 : Generation capacity under TKYB sub-loans (Megawatt)	
Formula	177,445 USD per MW
Description	Power generation capacity as described in DLI 2, under sub-loans by TKYB.
Data source/ Agency	TKYB reports
Verification Entity	IVA
Procedure	The IVA will verify, based on the report submitted by TKYB including documents described in the POM, such as the acceptance letter by the distribution company, that the capacity of sub-projects has been installed and are operational. The IVA will verify a small representative sample of these sub-loans, including through field visits.
3 : DSPV on-lending facility in place (Text)	
Formula	6,374,471 USD for each of DLR (a), DLR (b), DLR (c), and DLR (d)
Description	Establishment of a transparent and inclusive facility by the PIAs (TSKB and TKYB) through which they finance Facility Borrowers (FBs), such as commercial banks and leasing companies, to on-lend to sub-project borrowers for DSPV investments. The DLRs are: (a) definition of transparent and inclusive criteria for FB participation and for sub-project selection, acceptable to IBRD; (b) finalization of Facility Operational Manual (FOM) acceptable to IBRD, including role of PIAs in terms of due diligence, fiduciary and safeguards requirements, and rules of disbursement from signing to commissioning; (c) awareness and capacity building carried out as defined in the PAP for groups of potential FBs; and (d) first three sub-loan agreements with FBs signed.
Data source/ Agency	TSKB and TKYB reports
Verification Entity	IVA
Procedure	The IVA will verify, based on the reports submitted by TSKB and TKYB, that FOM, signing with FBs, and awareness and capacity building is completed as described in the PAP and POM. Facility disbursement will be based on amount of loans disbursed through the facility. For DLRs 'a' and 'b', the IVA will consult with the IBRD Task Team to validate acceptability of the facility criteria and FOM.
4 : Facility sub-loans by PIAs (Amount(USD))	
Formula	Refer to sub-DLIs
Description	This is a parent DLI that displays the cumulative monetary amounts of sub-loans for DSPV made to sub-project borrowers by the Facility Borrowers (FBs) through funds on-lent by the PIAs, namely TSKB and TKYB, as captured in DLI 4.1 and 4.2 respectively. It does not represent a true DLI that disburses against an achievement.
Data source/ Agency	Refer to sub-DLIs
Verification Entity	Refer to sub-DLIs
Procedure	Refer to sub-DLIs
4.1 : Facility sub-loans by TSKB (Amount(USD))	
Formula	198,779 USD per USD million of sub-loan amount for each of DLR (a), DLR (b), and DLR (c)
Description	Sub-loans, as described in DLI 4, made by FBs through TSKB. The DLRs are: (a) signing by TSKB of sub-loan agreement with sub-borrower; (b) disbursement by TSKB to sub-borrower of at least 30%; and (c) disbursement by TSKB to sub-borrower of at least 60%.
Data source/ Agency	TSKB reports
Verification Entity	IVA
Procedure	The IVA will verify, based on the report submitted by TSKB, the number of sub-loan agreements signed and disbursements of FBs to sub-borrowers through on-lent funds from TSKB. Eligibility criteria and relevant data described in the POM such as borrower name, loan amount, and disbursed and undisbursed amounts will be verified. The IVA will also verify a small representative sample of these sub-loans, including through field visits.
4.2 : Facility sub-loans by TKYB (Amount(USD))	
Formula	198,779 USD per USD million of sub-loan amount for each of DLR (a), DLR (b), and DLR (c)
Description	Sub-loans, as described in DLI 4, made by FBs through TKYB.



	The DLRs are: (a) signing by TKYB of sub-loan agreement with sub-borrower; (b) disbursement by TKYB to sub-borrower of at least 30%; and (c) disbursement by TKYB to sub-borrower of at least 60%.
Data source/ Agency	TKYB reports
Verification Entity	IVA
Procedure	The IVA will verify, based on the report submitted by TKYB, the number of sub-loan agreements signed and disbursements of FBs to sub-borrowers through on-lent funds from TKYB. Eligibility criteria and relevant data described in the POM such as borrower name, loan amount, and disbursed and undisbursed amounts will be verified. The IVA will also verify a small representative sample of these sub-loans, including through field visits.
5 : Generation capacity under facility sub-loans (Megawatt)	
Formula	Refer to sub-DLIs
Description	This is a parent DLI that displays the cumulative amounts of DSPV generation capacity made to sub-project borrowers by FBs under DLI 5.1 and 5.2 respectively. It does not represent a true DLI that disburses against an achievement.
Data source/ Agency	Refer to sub-DLIs
Verification Entity	Refer to sub-DLIs
Procedure	Refer to sub-DLIs
5.1 : Generation capacity under facility sub-loans by TSKB (Megawatt)	
Formula	184,427 USD per MW
Description	Power generation capacity as described in DLI 5, under sub-loans by FBs through TSKB.
Data source/ Agency	TSKB reports
Verification Entity	IVA
Procedure	The IVA will verify, based on the report submitted by TSKB including documents described in the FOM, such as the acceptance letter by the distribution company, that the capacity of sub-projects has been installed and is operational. The IVA will verify a small representative sample of these sub-loans, including through field visits.
5.2 : Generation capacity under facility sub-loans by TKYB (Megawatt)	
Formula	184,427 USD per MW
Description	Power generation capacity as described in DLI 5, under sub-loans by FBs through TKYB.
Data source/ Agency	TKYB reports
Verification Entity	IVA
Procedure	The IVA will verify, based on the report submitted by TKYB including documents described in the FOM, such as the acceptance letter by the distribution company, that the capacity of sub-projects has been installed and is operational. The IVA will verify a small representative sample of these sub-loans, including through field visits.
6 : PIA sub-loans for battery energy storage system (BESS) [CTF] (Amount(USD))	
Formula	Refer to sub-DLIs
Description	This is a parent DLI that displays the cumulative monetary amounts of sub-loans for for battery energy storage system (BESS) made to sub-project borrowers by the PIAs, namely TSKB and TKYB, as captured in DLI 6.1 and 6.2 respectively. It does not represent a true DLI that disburses against an achievement.
Data source/ Agency	Refer to sub-DLIs
Verification Entity	Refer to sub-DLIs
Procedure	Refer to sub-DLIs
6.1 : TSKB sub-loans for BESS [CTF] (Amount(USD))	
Formula	333,334 USD per USD million of sub-loan amount for each of DLR (a) and DLR (b)
Description	Sub-loans, as described in DLI 6, made by TSKB. The DLRs are: (a) signing by TSKB of sub-loan agreement with to sub-borrower; and (b) disbursement by TSKB to sub-borrower of at least 50%.
Data source/ Agency	TSKB reports
Verification Entity	IVA
Procedure	The IVA will verify, based on the report submitted by TSKB, the number of sub-loan agreements signed and disbursements to sub-projects against the eligibility criteria and relevant data described in the POM such as borrower name, loan amount, and disbursed and undisbursed amounts. The IVA will verify a small representative sample of these sub-loans, including through field visits.



6.2 : TKYB sub-loans for BESS [CTF] (Amount(USD))	
Formula	333,334 USD per USD million of sub-loan amount for each of DLR (a) and DLR (b)
Description	Sub-loans, as described in DLI 6, made by TKYB. The DLRs are: (a) signing by TKYB of sub-loan agreement with to sub-borrower; and (b) disbursement by TKYB to sub-borrower of at least 50%.
Data source/ Agency	TKYB reports
Verification Entity	IVA
Procedure	The IVA will verify, based on the report submitted by TKYB, the number of sub-loan agreements signed and disbursements to sub-projects against the eligibility criteria and relevant data described in the POM such as borrower name, loan amount, and disbursed and undisbursed amounts. The IVA will verify a small representative sample of these sub-loans, including through field visits.
7 : BESS capacity under PIA sub-loans [CTF] (Megawatt)	
Formula	Refer to sub-DLIs
Description	This is a parent DLI that displays the cumulative amounts of BESS capacity made to sub-project borrowers by TSKB and TKYB under DLI 7.1 and 7.2 respectively. It does not represent a true DLI that disburses against an achievement
Data source/ Agency	Refer to sub-DLIs
Verification Entity	Refer to sub-DLIs
Procedure	Refer to sub-DLIs
7.1 : BESS capacity under TSKB sub-loans [CTF] (Megawatt)	
Formula	156,250 USD per MWh
Description	BESS capacity as described in DLI 7, under sub-loans by TSKB.
Data source/ Agency	TSKB reports
Verification Entity	IVA
Procedure	The IVA will verify, based on the report submitted by TSKB including documents described in the FOM, that the capacity of sub-projects has been installed. The IVA will verify a small representative sample of these sub-loans, including through field visits.
7.2 : BESS capacity under TKYB sub-loans [CTF] (Megawatt)	
Formula	156,250 USD per MWh
Description	BESS capacity as described in DLI 7, under sub-loans by TKYB.
Data source/ Agency	TKYB reports
Verification Entity	IVA
Procedure	The IVA will verify, based on the report submitted by TKYB including documents described in the FOM, that the capacity of sub-projects has been installed. The IVA will verify a small representative sample of these sub-loans, including through field visits.



ANNEX 2. TECHNICAL ASSESSMENT

A. Strategic Relevance

1. **Türkiye aspires to achieve net-zero emissions by 2053, but achieving this goal will require major restructuring of its energy system.** The country ratified the Paris Agreement in October 2021 and its pledge to achieve net zero emissions was a strong signal of the country's commitment to join the global community in tackling the global climate emergency. In late 2021, Türkiye submitted the first iteration of its NDC to the UNFCCC, outlining its climate actions and targets. Türkiye's energy sector, including power generation, transport, building, and industrial sectors, is the country's single largest contributor to GHG emissions, accounting for about 75% of total emissions. Therefore, the government of Türkiye's (GoT) main mitigation strategy in this regard has been to utilize renewable energy (RE) resources to the maximum extent and promote energy efficiency subject to feasibility, market conditions, and energy security. These actions taken by the government are broadly aligned with a strategy that involves deploying RE resources, capitalize and promote energy efficiency gains, while promoting security of supply to meet its energy needs and reduce import dependence.

2. **Building on its successful track record of tripling RE capacity in the last decade, Türkiye can achieve energy security through an accelerated pace of least-cost investments in scaling up domestic solar and wind-based power generation.** In its most recent National Energy Plan, Türkiye aims to install 52.9 GW of solar capacity and 29.6 GW of wind capacity (24.6 GW onshore wind and 5 GW offshore wind).¹⁵ Further, the 2022 World Bank Country Climate Change and Development Report (CCDR)¹⁶ for Türkiye aligns with the country's commitments made in its policy making. The CCDR report highlighted that the country can leverage substantial co-benefits by investing in RE assets, promoting energy efficiency, battery and pumped storage, geothermal, and gas generation with carbon capture and storage (CCS). This would enable the country to meet a doubling of energy demand by 2053 to fuel its growth ambitions, with the added benefit of lowering emissions and improving energy security by reducing reliance on imported fossil fuels.

3. **The primary energy consumption in Türkiye has more than doubled over the past two decades to fuel economic growth and is projected to increase by 50 percent over the next two decades.** A large portion of its energy demand (up to 75 percent) depends on imports of fossil fuels (99 percent of gas and 93 percent of oils are currently being imported), and its energy imports accounted for almost 20 percent of Türkiye's total imports in 2021, contributing to massive current account deficits (US\$50.7 billion in 2021). The country's high energy and carbon intensity, 145 ktoe/US\$ 2015 and 440 g CO₂e/kWh, respectively (well above the EU averages which are 88 ktoe/US\$ 2015 and 229 g CO₂e/kWh, respectively), make it vulnerable to global energy prices. However, in response to increasing consumer energy price inflation (for 2022 around 137 percent), Türkiye has accelerated energy efficiency investments which made it second among OECD countries in terms of improvement of energy intensity in 2021.

4. **The industrial and commercial sector (including services) will witness the highest growth in increased average electricity demand of 5.5% between 2020 and 2035.**¹⁷ Absent any intervention, the share of final energy consumption for the industrial and services sector is slated to rise to about 53% of the economy by 2035. Therefore, it is crucial to deploy Distributed Energy Resources (DER), such as distributed solar photovoltaics (DSPV) and Battery Energy Storage Systems (BESS), to off-set the price burden faced by such customer segments without stressing the transmission and

¹⁵ Türkiye National Energy Plan 2022. https://enerji.gov.tr/Media/Dizin/EIGM/tr/Raporlar/TUEP/T%C3%BCrkiye_National_Energy_Plan.pdf

¹⁶ Türkiye Country Climate and Development Report 2022. <https://openknowledge.worldbank.org/entities/publication/01826a0c-059f-5a0c-91b7-2a6b8ec5de2f>

¹⁷ Türkiye's National Energy Plan 2022. https://enerji.gov.tr/Media/Dizin/EIGM/tr/Raporlar/TUEP/T%C3%BCrkiye_National_Energy_Plan.pdf



distribution systems, while promoting industrial competitiveness. This will also ensure that Türkiye's final energy consumption is on a cleaner trajectory towards in the coming decades.

5. **By scaling-up a commercial market for DER and leveraging private sector resources, the proposed Program will support Türkiye's energy security and accelerate the transition towards clean energy.** First, development of domestic RE will enhance the country's energy security: each MWh of distributed solar generation will displace natural gas generation (mostly imported) not only advancing the country's decarbonization agenda but also its macroeconomic stability and energy independence. Second, as highlighted in the World Bank Türkiye CCDR, large investments would be required to decarbonize the Turkish economy, half of which are expected from the private sector. Today, such commercial and private financing is not flowing to the DER market. The proposed Program will improve the industry readiness to invest in DSPV and BESS by leveraging approximately US\$300M in private sector financing. This market segment can efficiently provide significant energy cost savings because it entails shorter permitting and development timelines along with faster payback period when compared to large utility scale renewables projects.¹⁸

B. Program Rationale

6. **DER take-up has been limited to date since it is not financially viable for all customers as they face both high up-front costs and high financing costs as well as additional market barriers.** Banks and financial institutions face high inflation, currency devaluation, liquidity pressures, and uncertainty, which constrains lending for the DER market. A market assessment carried out during project preparation showed that very limited financing is available for DER and only for financially viable industrial and large commercial customers that can borrow in foreign currency or large commercial or multifamily residential buildings able to borrow in Turkish lira given the currently available commercial lending terms. Even for these customers for whom the investment is financially viable, there are several market barriers that create additional obstacles.

7. **BESS technology still requires support to develop and pilot business model applications that are viable in the Turkish energy market.** According to a 2021 World Bank analysis, there is a limited number of developers today ready to invest in BESS, mainly due to the developing regulatory context and limited commercial viability of existing solutions and limited number of business models to deploy energy storage solutions. The proposed Program will provide financing for the private sector to pilot innovative business models to scale up DSPV deployment and innovative solutions such as BESS.

8. **Macroeconomic and market conditions have constrained commercial lending for DERs.** Persistent high inflation has increased banks' exposure to market volatility, which has made banks more risk averse and constrained lending. Commercial banks' ability to offer affordable loans is limited by high costs to hedge the currency risk and liquidity pressures. Banks' limited access to long-term funding and the demand for longer maturities for investment loans in general (such as DSPV) create mismatch in the term structure of their balance sheets, making it more difficult and more expensive to finance loans with maturities longer than four years. Furthermore, uncertainty in the market has also led to more conservative lending caused by rising nonperforming loans (NPLs), which in turn has suppressed customer demand for loans.

9. **Commercial Turkish banks have limited experience assessing DER project lending to MSMEs.** DSPV is often viewed as a stand-alone investment, not one directly related to the production process, because DSPV is a power-generating technology rather than a productive technology that requires upgrades (like most energy efficiency investments). Therefore, this can make it harder to market and actively sell to clients, especially in a stagnant lending market and without the clear prospect of cash flow generation from a FiT scheme. Most of the loan sales happen at the

¹⁸ <https://www.pv-tech.org/edp-to-invest-e2-5-billion-to-add-4gw-of-distributed-solar-capacity-by-2026/>

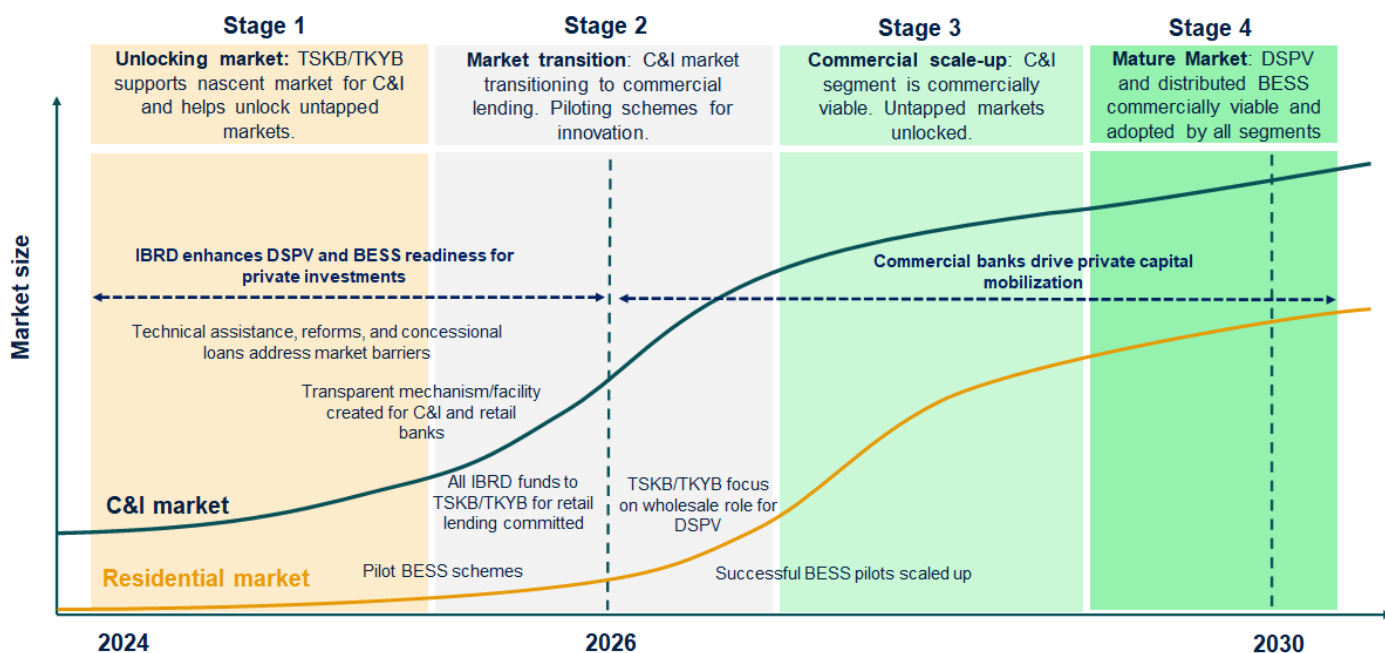


branch level in regional offices, which lack knowledge of assessing DSPV projects, while the front-office staff is often not well equipped to promote and market this type of investment. Experience with BESS is even less.

10. **Experience from other countries shows that a large and creditworthy market is needed to create the ecosystem to attract private sector providers that will allow the DER market to grow and innovate.** DER in the C&I sector has large potential and is the most financially viable market segment. However, it remains challenging to realize it due to a lack of well-defined market structure, lack of commercial financing, and lack of supporting enabling environment and regulatory support. In addition, small and medium-sized corporate offtakers have no credit ratings unlike large players and this creates a problem as traditional credit rating agencies only focus on large commercial entities. Despite recent regulatory changes aiming to create a more conducive environment to scale up investments in DER, there remain important challenges to unlock access to financing.

11. **Moving to a fully fledged commercial market for DER will require an incremental and phased approach, characterized by strong public support in the early days.** Figure 1 below shows the key stages of such market transition, whose stages 1 and 2 are targeted under the proposed Program. In stage 1, the Program will use Türkiye’s two leading development banks, Development Bank of Türkiye (Türkiye Sinai Kalkınma Bankasi, TSKB) and Development and Investment Bank of Türkiye (Türkiye Kalkınma ve Yatırım Bankasi, TKYB), as Program Implementing Agencies (PIAs), leveraging their technical and fiduciary experience to have a demonstrative effect and provide dedicated financing for DER. In stage 2, the PIAs will establish a facility to lend to commercial banks and other financing entities (Facility Borrowers [FBs]), who will be supported to access funds on-lent by the PIAs, enlarging the financial market for DER. In this way, the development banks will transfer their technical and financial knowledge to others operating in a market where the other commercial banks are not willing to tap. In subsequent phases, public support is expected to substantially decrease, leaving more and more space to commercial financing until the market achieve full maturity.

Figure 4. Expected DSPV and BESS Market Transition in Türkiye





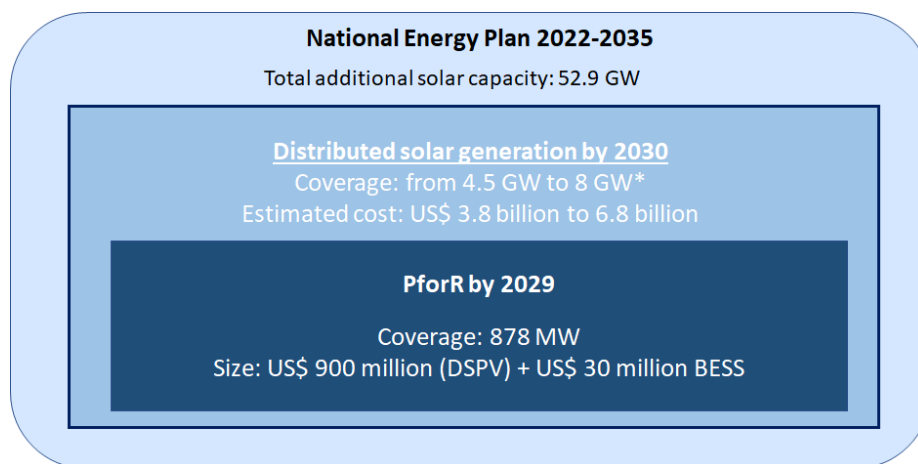
12. **The proposed program will help create a large market for commercial financing of DER which includes DSPV and BESS to support Türkiye’s energy security and accelerate decarbonization.** It will leverage private sector financing to tap into the C&I segment—the most financially viable segment—and have a demonstrational effect to anchor the development of the broader DER market. Supporting C&I clients will help develop the broader distributed solar generation ecosystem to lower overall costs and make the most challenging market segments viable as a customer base while providing a premium to early movers who are taking the current market risk. In this context, the proposed financing structure and bringing commercial banks/leasing companies into the financing sphere will be instrumental to meet emerging demands of relatively smaller size SMEs. Further, the Program will support the development and implementation of new innovative financing and business models, including for new technologies such as BESS. This support will be critical to effectively scale up DER and meet Türkiye’s overall RE deployment objectives.

C. **Program Scope**

13. **Türkiye published a NEP in December 2022 outlining its vision for the sector up to 2035 based on the country’s 2053 net zero emission target.** Per the new NEP, total installed generation capacity is expected to increase to 189.7 GW by 2035 from 95.9 GW in 2020, with 52.9 GW in total solar capacity (a fivefold increase from 2022) and 29.6 GW in total wind power capacity (an almost threefold increase from 2022). An estimated 3.1 GW of solar and 1.4 GW of wind power therefore needs to be added per year to reach the targets. The share of RE sources in installed capacity is expected to reach 64.7 percent, of which 43.5 percent represents intermittent sources. To increase network flexibility, an estimated 7.5 GW in BESS is also expected to be deployed during this period, in parallel to RE investments.

14. **The proposed PforR operation directly contributes to the implementation of the NEP, including by helping unlock about 20% of solar capacity in the DSPV market.** About US\$22 billion of additional investment would be required to achieve the 2035 target of 52.9 GW for installed solar capacity, including both utility scales and distributed generation. A World Bank and IFC market analysis carried out in 2021 showed the potential for the DSPV market to be a minimum of 4.5 GW by 2030, requiring at least 750 MW of new DSPV per year and corresponding to a financing need of US\$3.8 billion (figure 3). Most of these investments will come from local RE developers, consumers, and financial institutions. MENR’s Strategic Plan also noted that measures must be taken to develop financing facilities and incentives aimed at promoting the implementation of RE investment to materialize RE’s high potential, as well as financing models for BESS.

Figure 3. Türkiye National Energy Plan targets, potential for DSPV and contribution from the PforR



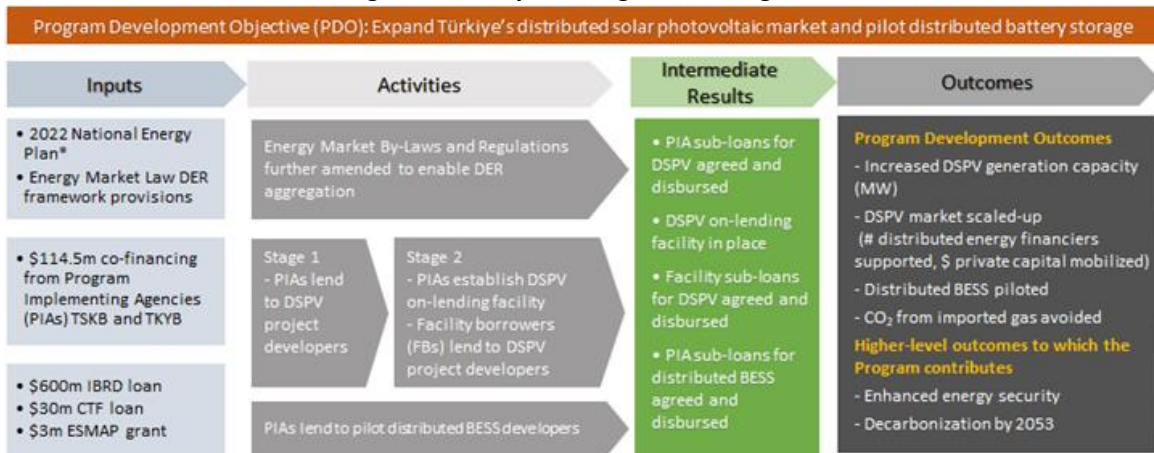
Note: Total additional solar capacity includes utility-scale generation through independent power producers/auctions (YEKA Program).*WBG Market Analysis 2021.



D. Program Development Objective(s) (PDO) And PDO Level Results Indicators

- 15. The PDO is to expand Türkiye’s distributed solar photovoltaic market and pilot distributed battery electricity storage.
- 16. The proposed PDO-level indicators would be:
 - (f) Renewable energy generation capacity enabled (MW);
 - (g) Distributed energy financiers supported (number);
 - (h) Private capital mobilized (US\$, million);
 - (i) Distributed BESS piloted (yes/no) and
 - (j) Greenhouse gas emissions from imported fossil gas avoided (metric tons CO2 equivalent).
- 17. The theory of change is presented in Figure 4 below.

Figure 4. Theory of Change of the Program



E. Program Activities

18. The World Bank’s proposed PforR is closely linked with the NEP and the three results areas described under Objective 1, ‘Ensure sustainable security of supply’ of MENR’s Strategic Plan 2019–2023. The PforR is designed to have a sharp focus on the areas underperforming in Türkiye’s distributed solar market. MENR’s Strategic Plan highlights that the country has high untapped RE potential and that it needs investments to increase the integration of renewable and distributed generation to the electricity system. In addition, it recognizes the need to develop the regulatory framework for battery storage, together with a cost analysis and an assessment of viable financing models for fixed energy storage systems. This PforR operation will help the GoT objectives to increase the use of domestic primary energy resources and increase self-consumption of on-site energy generation from self-financed clean energy generation technologies.

19. The geographic coverage of the PforR will be nationwide in line with the Government program. The duration of the PforR Program will be five years in a phased manner, starting from 2024 until the anticipated target completion by 2029. The MENR Strategic Plan covers the period from 2019 to 2023, finishing just as the proposed PforR Program begins.



However, a new MENR strategic four-year plan for the period of 2024–2028 is currently under development and will be effective in 2024 with enhanced targets for RE and ambitious goals for climate change mitigation, in line with the NEP published in 2022, which outlines a vision to add an additional 3.1 GW in solar PV capacity per year between now and 2035. The new strategic plan is also expected to be fully in line with the upcoming 12th NDP (2024–2028), which will advance Türkiye’s long-term objectives through a sustainable development approach. The PforR will also support the preparation of the new MENR Strategic Plan.

20. **The proposed PforR will focus on strengthening the DSPV sector for C&I market segment while unlocking opportunities to crowd in private sector investments and innovation for DSPV and BESS, thereby contributing to the achievement of the GoT’s solar PV and BESS targets.** More specifically, the proposed program will focus on two results areas:

- (a) **Results Area 1 – Scaling-up distributed solar PV.** Investments will support the installation of grid-connected distributed solar PV systems. The DSPV systems could include rooftop solar photovoltaic (RSPV) and ground-mounted solar PV, as well as newer technologies such as façade PVs and floating PV. The systems installed will be primarily for self-consumption, eligible for net metering¹⁹ and connected to the distribution grid. This results area targets the C&I market segments, which are essential to create the broader market ecosystem for DSPV. The eligible sub-borrowers include DSPV customers, DISCOs, leasing companies, and aggregators who own, operate, and maintain the DSPV systems for customers to supply electricity to C&I buildings.
- (b) **Results Area 2 - Expanding the market and promoting innovation for distributed energy.** This will help unlock commercial financing at scale for DSPV and support innovation for BESS. Under this results area, (i) the two PIAs will set up a facility to finance commercial banks selected transparently and competitively, (ii) these commercial banks will finance DSPV projects, including through their own financing. A recipient-executed grant of US\$3 million from ESMAP will be disbursed against the DLI for establishment of the facility. Separately, a CTF US\$30 million credit will support BESS investments financed by the PIAs, having an important demonstrational effect for the market and the broader banking industry. Eligible sub-borrowers for battery storage include renewable developers, battery storage companies, aggregators, and DSPV consumers.

F. **Disbursement Linked Indicators and Verification Protocols**

21. **DLIs are key results linked to the PforR and will trigger the disbursements upon achievement.** DLIs in Results Area 1 are linked to the investments to scale up DSPV while DLIs in Results Area 2 targets financing barriers and innovation. All DLIs are summarized in the table below.

Table 8. Program DLIs

DLIs	Description of DLIs	Disbursement Amount (US\$, millions)
Results Area 1: Scaling up distributed solar PV (DSPV)		
DLI 1.1: TSKB sub-loans for DSPV (US\$, million)	Sub-loans from PIAs to sub-project borrowers for DSPV.	145.0 (IBRD)
DLI-1.2: TKYB sub-loans for DSPV (US\$, million)	The end-of-program target of this DLI is US\$269.0 million for each PIA.	145.0 (IBRD)

¹⁹ Only distributed PV subprojects that qualify for ‘unlicensed’ electricity production pursuant to the ‘Unlicensed Electricity in the Electricity Market Production Regulation’ No. 30772 published in the official gazette on May 12, 2019, and its subsequent amendments will be eligible for financing under the Program.



DLIs	Description of DLIs	Disbursement Amount (US\$, millions)
DLI-2.1: Generation capacity under TSKB sub-loans (MW)	Generation capacity from DSPV sub-projects financed with PIA sub-loans. Given the potential large number of solar PV units installed, the verification of this DLI will be on a sampling basis, in each market segment. The end-of-program target of this DLI is 317 MW for each PIA.	56.25 (IBRD)
DLI-2.2: Generation capacity under TKYB sub-loans (MW)		56.25 (IBRD)
Results Area 2: Expanding the market and promoting innovation for distributed energy		
DLI-3: DSPV on-lending facility in place (Text)	Establishment of a transparent and inclusive facility by the PIAs (TSKB and TKYB) through which they finance Facility Borrowers (FBs) to on-lend to sub-project borrowers for DSPV investments. Four DLRs capture incremental progress for establishing the facility.	22.5 (IBRD) 3.0 (ESMAP)
DLI-4.1: Facility sub-loans by TSKB (US\$, million)	Facility sub-loans disbursed to sub-project borrowers to finance DSPV. The end-of-program target of this DLI is US\$109.0 million for each PFI.	65.0 (IBRD)
DLI-4.2: Facility sub-loans by TKYB (US\$, million)		65.0 (IBRD)
DLI-5.1: Generation capacity under facility sub-loans by TSKB (MW)	Sub-loans disbursed to sub-borrowers to finance DSPV investments. The end-of-program target of this DLI is 122 MW for each PIA.	22.5 (IBRD)
DLI-5.2: Generation capacity under facility sub-loans by TKYB (MW)		22.5 (IBRD)
DLI-6.1: TSKB sub-loans for BESS [CTF] (US\$, million)	Sub-loans disbursed to sub-borrowers to finance BESS investments. The end-of-program target of this DLI is US\$15 million for each PIA.	10.0 (CTF)
DLI-6.2: TKYB sub-loans for BESS [CTF] (US\$, million)		10.0 (CTF)
DLI-7.1: BESS capacity under TSKB sub-loans (MWh)	Installed BESS capacity (MWh) financed in subprojects. Eligible types of battery storage include generation, transmission, distribution grids, and consumers. The end-of-program target of this DLI is 32.0 MWh for each PIA.	5.0 (CTF)
DLI-7.2: BESS capacity under TKYB sub-loans (MWh)		5.0 (CTF)

22. **Verification protocol and arrangement.** A third-party independent verification agency (IVA) will be competitively selected by the PIAs to verify the DLI results using the agreed verification methods. The qualifications of a third-party IVA, including expertise and experience both in financial auditing and in the RE field, should be satisfactory to the World Bank. PIAs will jointly select a single IVA to ensure consistency and transparency in carrying out verification. Results verification methodology, protocol, and procedures are available in Annex 1 and will be further outlined in the Program Operational Manual (POM).

G. Project pipeline, Eligible Expenditure and Expenditure Framework

Project Pipeline

23. **TSKB and TKYB have strong initial pipelines of DSPV subprojects for C&I customers and potential BESS subprojects as well. For DSPV, subproject pipeline estimates indicate 55 subprojects for roughly 0.9 GW and total investment cost of about US\$900 million.** On average, each project cost is about US \$0.9 million per MW installed. Of the 55 subprojects, 42 are ground mounted and 13 are rooftop subprojects. Both pipelines include rooftop solar and ground-mounted installations, ranging from 1 MW to 100 MW. All these projects are for self-consumption, falling under Türkiye’s unlicensed generation regulation, and would be connected to the distribution grid. Subproject allocation by sector is about half for various manufacturing activities and around 10 percent each for construction, tourism and logistics, mining, and health. For BESS subprojects, pipeline includes about 70 MW of subprojects, all of ground mounted type across different locations in Türkiye.



24. **Given their networks and market knowledge, the PIAs are confident additional projects will materialize once the proposed Program is approved.** At the current stage, pipeline is indicative. However, due diligence is already advanced for many subprojects and awaiting financing availability. Both PIAs are confident that, once the financing is available and they are able to market it, further subprojects will be added. Final investment decision to finance a subproject will depend on due diligence to be carried out according to the Program criteria.

Eligible Expenditure

25. Eligible DER include supply, installation, works and consultancy services associated with facilities in the list of technologies below, subject to the following general limitations:

- a) All facilities are purchased, installed, owned and operated by a private party;
- b) Facilities are assessed as having no greater than Moderate risk according to environmental and social requirements defined in the POM or FOM; and
- c) Electricity generation and storage that are connected to the electricity network, if at all, are connected only at distribution level (36 kV and below), not transmission level (above 36 kV).

26. For all technologies below, investments can include associated balance of system items such as mounting racks, meters, inverters, controllers, other power electronics, or other items that are integral parts of the system.

1. Photovoltaics within the scope of the Regulation on Unlicensed Electricity Generation in the Electricity Market,²⁰ under the following categories:
 - Generation facilities based on renewable energy resources with an installed capacity up to 5 MW, i.e., the limit determined within the framework of the Electricity Market Law (per Article 5.1.c of the abovementioned Regulation);
 - Generation facilities based on renewable energy resources that use all of the energy they produce without giving it to the distribution system, and whose production and consumption are at the same measurement point (Article 5.1.ç); and
 - Generation facility based on renewable energy resources established at the same or different measurement point with the consumption facility, provided that municipalities and their affiliates, industrial facilities and facilities for agricultural irrigation purposes are limited to twice the contract power in the connection agreement and other persons are limited to the contract power in the connection agreement (Article 5.1.h)

The above PV facility categories are without limitation to mounting context: ground-mounted, rooftop, canopy, façade (building integrated PV), or floating.

2. Stationary battery energy storage systems (BESS) within the scope of the Regulation on Storage Activities in the Electricity Market²¹, under the following categories:

²⁰ Published May 12, 2019 in Official Gazette No. 30772 as amended, with most recent [known] amendment published July 29, 2023 in Official Gazette No. 32263). 'Unlicensed' refers to generation facilities that can be established exempt from the obligation to obtain preliminary license and license and to establish a company.

²¹ Published May 9, 2021 in Official Gazette No. 31479 as amended, with the most recent [known] amendment published November 19, 2022 in the Official Gazette No. 32018.



- Electricity storage facility integrated into a consumption facility (per Article 4.1.b and Article 6 of the abovementioned regulation)
- Electricity storage facility established by distribution companies, i.e. grid operators for networks 36 kV and below (Article 4.1.ç and Article 8.1)
- Electricity storage facility in unlicensed electricity generation facilities (Article 4.3)

The above storage facility categories are without limitation to the use case: e.g., providing technical (ancillary) services to the grid including to support integration of variable renewable energy; avoiding curtailment of variable renewable generation at certain times of grid congestion when supply exceeds local demand and exceeds the grid’s hosting capacity; storing surplus distributed solar electricity instead of exporting to the grid; electrical vehicle charging stations with stationary batteries charged by distributed renewables. PV generation can be integrated into an electric vehicle charging station in order to meet the electricity needs of the charging station, with a right to sell as much electricity to the grid as is consumed, and storage can be integrated into the consumption facility can be established within a charging station, per the Charging Service Regulation (Article 24).

3. Solar thermal technology, including solar collectors, for heating water or any other heating process. Note: while these are an eligible expenditure, they do not count toward DLIs.
4. Electric heat pump systems for heating and cooling. Note: while these are an eligible expenditure, they do not count toward DLIs.

Expenditure Framework

27. The proposed Program expenditure is US\$930 million (see 1 below). The Program expenditures will occur when PIAs disburse sub-loans directly or through FBs, which will be subject to their due diligence and approval processes.

Table 9. Program Expenditure Framework

Program Expenditure	Cost (US\$, millions)
Goods associated with eligible DER investments included in Annex 2 (including, inter alia, supply of PV panels, BESS, invertors, DC and AC cabling and distribution board, connector, mounting equipment (construction or tracker) transformer and switchgear, SCADA systems, meters, CCTV, grounding, and lighting protection equipment)	728
Works associated with eligible DER investments included in Annex 2 (including, inter alia, installation of: PV panels, BESS, invertors, DC and AC cabling and distribution board, connector, mounting equipment (construction or tracker) transformer and switchgear, SCADA systems, meters, CCTV, grounding, and lighting protection equipment)	182
Consulting services (including services associated with Independent Verification Agent, implementation of the PAP, setting up of the facility, engineering design, technical and financial feasibility study, obtaining necessary permits, commissioning and approval associated with eligible DER investments included in Annex 2)	20
TOTAL	930.0



H. Implementation Capacity

28. **Both PIAs have high capacity, market reach, and a strong record in the industry.** TSKB was established in 1950 with the support of the World Bank and the Central Bank of Turkey and shareholding of private commercial banks, and it is Türkiye's first privately owned development and investment bank. TSKB provides corporate banking, investment banking, and consultancy services to its customers. TKYB is a well-established government-owned development bank. Both PIAs have extensive experience in the implementation of World Bank-financed projects, including in the RE sector. Examples include Geothermal Development Project (P151739), Private Sector Renewable Energy and Energy Efficiency Project (P112578), Renewable Energy Project (P072480), Emergency Firm Support Project (P174112), Formal Employment Creation Project (P171766), Inclusive Access to Finance (P163225), and Innovative Access to Finance (P147183). Annex 9 and Annex 10 include further information on TSKB and TKYB broader assessments carried out by the World Bank. Those Annexes will be removed before public disclosure of the PAD.

29. **PIAs internal risk-based control systems are strong and well placed to manage the Program and macroeconomic shocks.** In the past, Türkiye financial sector has faced obstacles such as the COVID-19 pandemic, the TL depreciation, soaring inflation, and regulatory changes causing distortions in the banking sector, particularly in credit markets. Both PIAs have solid internal credit due diligence mechanism to mitigate such risks and potential impacts on the Program viability. Various internal layers carry out check and balances on the potential risk exposure of their lending activities. First, a thorough review is conducted for each investment under consideration by engineering, loan analysis, and sectoral experts in loan allocation/marketing departments. Further, potential loans are assessed based on credit risk related thresholds that are reported on a daily basis. Internal control departments verify default credit risk limits, collateral, credit risk calculations, level changes in relevant regulations and structuring transactions. These results are regularly reported to the Audit Committee. Thanks to these solid internal process and controls, NPL ratios for both PIAs remain under the industry average. These assessment account for prevailing economic conditions and environmental factors that may impact cash flow projections. The impacts of foreign exchange fluctuations and inflation are consistently considered for cash flow projections.

30. **POM and FOM.** The FIs will prepare a POM and FOM that will outline their detailed sub-loan application procedure, criteria for subproject acceptance, criteria for review by the Credit Committee, currency of lending and hedging arrangements, and inclusion of mandatory clauses for sub-borrowers in their sub-loan agreements, such as anti-corruption, environment, social, and procurement principles. The FOM will include similar requirements for the facility in Stage 2. Both will be subject to World Bank review and no-objection (with the FOM approval being a DLR under DLI 3).

31. **Fiduciary.** An integrated assessment of each financial intermediary's institutional capabilities and fiduciary systems, including oversight and supervision, has been carried out. Its conclusions and main recommendations have been included in the relevant sections of this PAD, as well as in the Program Action Plan.

32. **E&S.** Similarly, an ESSA has been carried out to assess the adequacy of the PIAs' E&S systems. The program will build on the experience of other World Bank projects as well as use other relevant measures such as the POM, FOM and the PAP to mainstream environmentally and socially friendly practices in the Program.

33. **Results Monitoring and Evaluation.** The PIAs will be responsible for results M&E and arranging for independent verification of the DLIs, based on the agreed verification methodology, protocols, and procedures outlined in the relevant Program documents and requirements outlined in this PAD, as well as in the POM, FOM and PAP.



34. **Selection Criteria and Pricing Mechanisms.** The key preliminary selection criteria for sub-loans and FBs, as well as the pricing mechanisms for sub-loans under the program have been included in the relevant technical assessment sections of the PAD. They will be further detailed in the POM and FOM, which will be subject to World Bank validation.

I. Economic Evaluation and Justification

35. Sub project eligibility and viability is not known before hand and will depend on the criteria that will be developed by implementing agencies. Since the specific investments are not known up front, an economic and financial analysis was performed on the three following representative investments: (a) ground-mounted solar PV in the industrial sector (15 MWp installed DC capacity), (b) rooftop solar PV in the MSME sector (8 kWp installed DC capacity), and (c) rooftop solar PV in the residential sector (1.2 kWp installed DC capacity). An overview of the assumptions for the economic and financial analysis is presented in Table 14 at the end of this section. All three representative investments were found to be economically and financially viable over a period of 20 years (expected lifetime). Under the Program, only investments that are assessed as financially viable will be eligible.

36. **Economic analysis.** The economic analysis covers the following economic benefits: (a) economic value of energy generated from distributed RE installations (including avoided T&D losses), (b) reduction of local air pollution, and (c) reduction of CO₂ emissions²² (but results are also presented without CO₂ emission reduction benefits). The investments have several additional benefits that were not quantified for the economic analysis, such as enhanced energy security (reduced energy imports) or creation of local jobs. The economic costs considered in the analysis are capital investment for the distributed RE installations and operation and maintenance (O&M) and insurance costs of the RE systems. The economic costs and benefits of the investments were calculated exclusive of taxes and subsidies. The investments are considered economically viable if the NPV of economic benefits and costs is positive and if the EIRR is higher than the social discount rate of 6.97 percent.²³

37. The results of the economic analysis in the tables below confirm that all three representative investments are economically viable, even without CO₂ emission reduction benefits. About 74 percent of the economic benefits are from energy generated from the distributed RE installation, 2 percent from the associated reduction of local air pollutants, and 24 percent from the reduction of CO₂ emissions (when using the ‘low’ shadow price of carbon).

Table 10. Results of the Economic Analysis

	Ground-Mounted Solar PV, Industrial Sector	Rooftop Solar PV, MSME Sector	Rooftop Solar PV, Residential Sector
Economic analysis without CO ₂ emission reduction benefits			
Simple payback (Years)	5.7	4.7	7.3
Economic internal rate of return (EIRR, Percent)	16.3	20.0	12.1
Net present value (NPV, US\$)	11,282,058	7,695	596
Economic analysis with CO ₂ emission reduction benefits (low shadow price of carbon)			
Simple payback (Years)	4.3	3.5	5.6

²² The economic analysis used the ‘low’ and ‘high’ shadow price of carbon provided in the ‘Guidance note on shadow price of carbon in economic analysis, Nov 12, 2017’, US CPI adjusted (2022 USD).

²³ The social discount rate is calculated based on World Bank guidance, that is, using the Ramsey formula: $r = \beta + \epsilon \times \sigma$ where pure rate of time preference $\beta = 0$, elasticity of marginal utility of consumption $\epsilon = 2$, and expected growth rate of per capita consumption $\sigma = 0.0348$ (per capita GDP growth expressed in constant prices for 2017–2027 is 3.48 percent per year, IMF).



	Ground-Mounted Solar PV, Industrial Sector	Rooftop Solar PV, MSME Sector	Rooftop Solar PV, Residential Sector
EIRR (Percent)	22.2	26.7	17.1
NPV (US\$)	19,828,477	12,538	1,280
Economic analysis with CO ₂ emission reduction benefits (high shadow price of carbon)			
Simple payback (Years)	3.5	2.9	4.5
EIRR (Percent)	27.7	33.0	21.6
NPV (US\$)	28,347,015	17,365	1,961

38. **Sensitivity analysis.** The sensitivity analysis, which was carried out using the low shadow price of carbon (conservative assumption), shows that the EIRRs are robust to changes in the key assumptions (Table 11). The energy generated from the distributed RE installation displaces centralized electricity generation, and its economic value depends on the marginal cost of electricity generation and thus the cost of natural gas. Natural gas prices would have to be at least 86 percent lower in each year of the 20-year lifetime period of the investment for the EIRRs to fall below the hurdle rate. Investment cost would have to be between 84 and 170 percent higher for the EIRRs to fall below the hurdle rate.

Table 11. Summary of Switching Value Analysis

	Ground-Mounted Solar PV, Industrial Sector	Rooftop Solar PV, MSME Sector	Rooftop Solar PV, Residential Sector
Investment cost			
Base case (US\$/Wp)	1.00	0.85	1.25
Switching value (US\$)	2.29	2.29	2.29
Switching value (Percent)	229	270	184
Natural gas			
Base case	TTF futures until Dec 2031 and 36.9 EUR/MWh in subsequent years.		
Switching value (Percent)	-7	-19	14

39. **Financial analysis.** From a financial analysis perspective, the entity that installs the distributed RE system will benefit from reduced electricity bills, according to the ‘unlicensed’ RE regulation scheme,²⁴ over the lifetime of the investment. For the ground-mounted solar PV investment in the industrial sector, it was assumed that the points of RE generation and consumption are not the same, which results in additional distribution charges for the transfer of electricity. For the rooftop PV investments in the MSME and residential sectors, consumption was assumed to take place at the location of the RE installation (same meter), and a typical percentage of direct self-consumption was assumed. The financial analysis includes VAT and other taxes, and the investments are considered financially viable if the NPV of the cash flows is positive and if the FIRR is higher than the financial discount rate of 8.65 percent.²⁵

²⁴ Under the ‘unlicensed’ RE regulation scheme, a customer can feed generated excess electricity into the grid and be compensated for the excess electricity at the retail tariff. Compensation stops when the excess electricity exceeds the customer’s consumption on an annual basis.

²⁵ The financial discount rate is assumed equal to the beneficiaries’ borrowing cost under the Program: 4.90 percent SOFR (average of forecast April 2023 to December 2023) + 2.75 percent US dollar margin over secured overnight financing rate (US dollar margin in 2022 for syndicated loans) + 1 percent development bank spread.



40. The results of the financial analysis in Table 12 confirm that all three representative investments are financially viable.

Table 12. Results of the Financial Analysis

	Ground-Mounted Solar PV, Industrial Sector	Rooftop Solar PV, MSME Sector	Rooftop Solar PV, Residential Sector
Simple payback (Years)	6.7	5.4	9.1
Financial internal rate of return (FIRR, Percent)	14.5	18.7	9.5
NPV (US\$)	8,558,790	7,371	120

41. **Scenario analysis.** A scenario analysis was carried out by defining a plausible best and worst case for the key assumptions that have a higher degree of uncertainty (see table 3.6). In the plausible worst-case scenario, the rooftop solar PV investment in the MSME sector remains financially viable; the ground-mounted solar PV investment in the industrial sector and the rooftop solar PV investment in the residential sector become financially unviable, with an FIRR of 7.4 and 3.5 percent, respectively.

Table 13. Scenario Analysis

	Ground-Mounted Solar PV, Industrial Sector	Rooftop Solar PV, MSME Sector	Rooftop Solar PV, Residential Sector
Base case			
Investment cost (US\$/Wp)	1.00	0.85	1.25
Inflation and escalation of electricity tariff	Inflation (average consumer prices) forecast until 2027 as per International Monetary Fund (IMF) World Economic Outlook (WEO) and 15% in subsequent years. Annual escalation of electricity tariff is 15% (MENR).		
Simple payback (Years)	6.7	5.4	9.1
FIRR (Percent)	14.5	18.7	9.5
NPV (US\$)	8,558,790	7,371	120
Plausible best case			
Investment cost	20% lower than base case		
Inflation and escalation of electricity tariff	Inflation (average consumer prices) forecast until 2027 as per IMF WEO and 15% in subsequent years. Annual escalation of electricity tariff is equal to inflation.		
Simple payback (Years)	4.9	3.9	6.7
FIRR (Percent)	20.7	26.1	14.5
NPV (US\$)	15,023,375	10,827	689
Plausible worst case			
Investment cost	20% higher than base case		
Inflation and escalation of electricity tariff	Inflation (average consumer prices) 10 percentage points above forecast until 2027 and 15% in subsequent years. Annual escalation of electricity tariff is 15% (MENR).		
Simple payback (Years)	10.6	8.4	14.5
FIRR (Percent)	7.4	10.7	3.5
NPV (US\$)	-1,847,605	1,542	-735



Table 14. Assumptions for the economic and financial analysis (base case)

Assumptions	Unit	Value	Source
Technical assumptions for solar PV			
Annual degradation	Percent	0.50	National Renewable Energy Laboratory (2018) Lifetime of PV panels
AC/DC ratio	Percent	80	Design assumption
Average capacity factor solar PV	Percent	20%	Castalia (2022) EFA for Distributed Solar in Turkey
Self-consumption, industry/MSME/residential	Percent	0 43 38	Castalia (2022) EFA for Distributed Solar in Turkey
CAPEX and operational expenditure of solar PV systems			
Investment cost, ground-mounted PV, industry	US\$/Wp	1.00	TSKB
Investment cost, rooftop PV, MSME	US\$/Wp	0.85	TSKB
Investment cost, rooftop PV, residential	US\$/Wp	1.25	TSKB
VAT	Percent	18	Ministry of Environment, Urbanisation and Climate Change
Annual O&M cost	US\$/kWp	6.0	Feasibility study for Gerze Municipality (IZ Power)
Annual insurance cost, % of invest. cost	Percent	0.20	Castalia (2022) EFA for Distributed Solar in Turkey
Macroeconomic assumptions			
US\$1 in TRY		19.45	Exchange rate as of April 30, 2023
EUR 1 in US\$		1.10	Exchange rate as of April 30, 2023
US\$ inflation average consumer prices	Percent	Forecast until 2027 and 2% thereafter	IMF WEO database October 2022, accessed February 2, 2023
TRY inflation average consumer prices	Percent	Forecast until 2027 and 15% thereafter	IMF WEO database October 2022, accessed February 2, 2023
Social discount rate	Percent	6.97	Calculated as per World Bank guidance document
Marginal cost of electricity generation			
Natural gas price	EUR/MWh	TTF futures until 2031 and 36.9 EUR/MWh thereafter	TTF futures as of April 30, 2023
Delivery cost to Turkey	US\$/MMBTu	4.38	Castalia (2022) EFA for Distributed Solar in Turkey
Variable O&M cost for CCGT	US\$/MWh	4.00	Castalia (2022) EFA for Distributed Solar in Turkey
Efficiency CCGT plant	Percent	55	Bursa Combined Cycle Gas Turbine Project, Turkey
T&D losses	Percent	10	Enerdata (2021)
GHG emissions			
Emission factor	g/kWh	648.80	2020 emission factor for wind and solar (MENR, September 9, 2022)



Assumptions	Unit	Value	Source
Shadow price of carbon	US\$/t	Low/high shadow price	Guidance note on shadow price of carbon in economic analysis (World Bank, 2017), 2022 US dollar
Economic cost of local air pollution			
Consumer price index US\$ 2005		87.45	IMF
Consumer price index US\$ December 2022		136.11	IMF
NO _x 2005 prices	EUR/t	2,135	European Environment Agency (2011) Revealing the costs of air pollution from industrial facilities in Europe
SO ₂ 2005 prices	EUR/t	3,398	
PM ₁₀ 2005 prices	EUR/t	13,931	
PM _{2.5} 2005 prices	EUR/t	21,454	
NO _x intensity of natural gas	kg/MWh	0.4100	Atilgan, B., and A. Azapagic. 2015. "Life Cycle Environmental Impacts of Electricity from Fossil Fuels in Turkey." In <i>Journal of Cleaner Production</i> .
SO ₂ intensity of natural gas	kg/MWh	0.0030	
PM ₁₀ intensity of natural gas	kg/MWh	0.0000	
PM _{2.5} intensity of natural gas	kg/MWh	0.0030	
Interest rate			
SOFR	Percent	4.90	Average April 2023 to December 2023 (https://econforecasting.com/forecast-sofr)
US\$ margin over London Inter-Bank Offered Rate/SOFR	Percent	2.75	Central Bank of the Republic of Turkey (May 2022). Financial Stability Report: Volume 28
Development bank spread	Percent	1.00	Assumption
Electricity tariff			
Electricity tariff (industry/MSME/residential)	TRY/kWh	2.93 2.33 1.99	EMRA tariff April 1, 2023
Distribution charge consumption (industry/MSME/residential)	TRY/kWh	0.38 0.40 0.39	
Distribution charge unlicensed generation	TRY/kWh	0.67	
TRY inflation of energy tariffs	Percent	15	MENR
Municipality tax on energy consumption	Percent	5	MENR
VAT on energy consumption	Percent	8	MENR



ANNEX 3. SUMMARY FIDUCIARY SYSTEMS ASSESSMENT

- 1. An Integrated Fiduciary System Assessment (IFSA) was carried out by the Bank** to determine whether the Program fiduciary systems are adequate for providing reasonable assurance that the financing proceeds will be used for the intended purposes with due attention to the principles of economy, efficiency, effectiveness, transparency, and accountability. The Program procurement systems were assessed to ascertain that the planning, bidding, evaluation, contract award and contract administration arrangements and practices provide a reasonable assurance that the Program will achieve intended results through its procurement processes and procedures. Similarly, the financial management systems were assessed to ascertain that the relevant planning, budgeting, accounting, internal controls, funds flow, financial reporting, and auditing arrangements provide a reasonable assurance on the appropriate use of Program funds and safeguarding of its assets. The fiduciary assessment also considered how program systems handle the risks of fraud and corruption, including by providing complaint mechanism, and how such risks are managed and/or mitigated. The detailed IFSA is available in the Bank's records and the key findings and recommendations are summarized hereunder.
- 2. The IFSA found that Program fiduciary systems are sound and can be expected to enable the two PIAs, TSKB and TKYB, and eligible private sector sub-borrowers to implement the Program efficiently and provide reasonable assurance that the financing proceeds will be used for intended purposes.** Both PIAs have adequate financial management and procurement systems in place, including for appraisal, oversight, and supervision of sub-projects, and they are also experienced in the implementation of IBRD financed credit lines that follow IPF requirements. However, they lack experience with the PforR arrangements, especially relating to the program reporting and result-based disbursement arrangements which may result in delays in financial reporting and disbursement processing.
- 3. For further enhancing the fiduciary systems and capacity to manage the risks and address the World Bank's fiduciary requirements under the Program some additional strengthening measures have been incorporated in the Program Action Plan (PAP).** The PAP includes procurement related actions such as required provisions against use of Forced Labor in solar energy systems, application of the Bank's Anti-Corruption Guidelines including ineligibility of firms/individuals sanctioned by the Bank for award of contract and the Bank's right to investigate, and Financial Management related actions including reporting and disbursement related arrangements and requirements. The residual fiduciary risk is considerate Moderate.
- 4. Almost all the procurement expected under the Program will be undertaken by the private sector sub-borrowers themselves following well-established private sector commercial practices** and with oversight provided by the two PIAs. This will include Goods, Works and Consultants services related to Distributed Solar PV (DSPV) systems and Battery Energy Storage Systems (BESS). Given the private sector sub-borrowers' profit-driven nature and the highly competitive local market for works, goods, and services, the commercial practices and methods for procurement used in the private sector are fit for purpose and are deemed efficient and giving due attention to achieving value for money. The general process for private sector enterprises is to carry out a market analysis of available products/technologies/providers and establish long-term mutually beneficial relationships with the providers for obtaining the most advantageous prices. Many domestic private sector enterprises have purchasing departments that are subject to corporate internal controls. Audit and supervision departments in the enterprises also monitor expenditures.
- 6. There will be only limited procurement to be undertaken by the two PIAs, TSKB and TKYB, themselves under the Program which is expected to include a few consulting services contracts** including hiring of the Independent Verification Agent (IVA), which will follow TSKB and TKYB's Procurement Regulations and Manuals. Assessment of TSKB and TKYB's procurement systems, including procurement methods, control mechanisms and capacity including for oversight and supervision of sub-borrowers' procurement did not identify any significant gaps and fiduciary risks for use of the respective PIAs procurement systems under the Program.



7. **None of the contracts under the Program are expected to be “High Value contracts”** and would not fall within the thresholds for OPRC clearance²⁶. In case any such High Value contract is identified during implementation of the Program, it will not be eligible for IBRD financing under the Program. The category, type/nature and price range of contracts expected to be procured under the Program, including by the private sector sub-borrower or by TSKB and TKYB themselves,

8. **Both PIAs will have Financial Management responsibilities under the Program.** The fund flow will be as follows: a) the World Bank will sign a loan agreement with TSKB and TKYB, with MoTF guarantee; and b) TSKB and TKYB will sign loan agreements with sub-borrowers. Once achievement of the DLIs is verified by the IVA and the World Bank approves the verification report, IBRD funds will directly flow to TSKB and TKYB. The IBRD and CTF loans, as well as ESMAP grant, will be disbursed directly into the accounts of the two PIAs upon the achievement of the associated disbursement linked indicators and will be pooled with their own contributions to become the Program funds. The Program funds will be lent to sub-borrowers based on the PIAs’ commercial assessments and the POM agreed with the Bank. Internal Control procedures of PIAs for credits that will also be used for the PforR are well defined and comprehensive. Each PIAs’ accounting and financial reporting systems will be used to separately record and report on the Program activities.

9. **The two PIAs have financial management systems in place including planning, budgeting, internal controls, accounting, reporting and external audit.** The Program will be included in PIAs’ monitoring and control scopes. The Program-specific financial management and disbursement arrangements will be documented in the POM that will be agreed with the Bank. Both PIAs will maintain all copies of the Program accounting records. Program financial reporting is required to meet the Program oversight needs. As such, the financial report including the Program expenditures and source of funds should be furnished to the Bank by the implementing agencies as part of the Program Report no later than three months after the end of each calendar year. The internal audit function is organized in line with the regulations of the Banking Regulation and Supervision Agency (BRSA) in the implementing entities. Accordingly, both banks have an Audit Committee directly linked to the Board of Directors to assist board in the performance of its audit and oversight functions. Regarding External Auditing, both PIAs have their annual financial audit conducted by reputable audit firms which are included in the acceptable list of auditors issued by BRSA and based on the past performance, background, and experience both auditors are acceptable to the Bank.

10. **Corporate governance of both Bank’s is regulated by the Banking Law 5411, the Corporate Governance Regulation for Banks, the Capital Markets Law, and the Corporate Governance Principles** in the Corporate Governance Communiqué (2020) as both banks are joint stock companies formed under the Turkish Commercial Code. Both banks are under the supervision of both the BRSA and the Capital Markets Board (CMB). The independent role of the two regulatory agencies adds to the confidence of stakeholders that the bank is complying with good practices and transparency in their reporting standards and financial statements. TSKB’s high corporate governance rating stands as the most important indicator of this. Since its inclusion in the BIST Corporate Governance Index, the Bank has commanded one of the highest corporate governance ratings of any institution. TSKB ensures that the board of directors consists of members with the necessary knowledge, skills and industry expertise to fulfill their responsibilities as required and in line with the local regulations in force. The Bank aims full compliance with the relevant regulations, laws and principles and has an embedded and fully transparent TSKB Anti-Bribery and Anti-Corruption Policy²⁷. TKYB has also strong governance

²⁶ For the current procurement risk rating as moderate: USD 115 million for Works; USD 75 million for Goods; and USD 30 million for Consultant Services or equivalent which may change from time to time according to the procurement risk ratings at the time of Program Implementation.

²⁷ <https://www.tskb.com.tr/en/services/sustainable-banking/our-policy/tskb-anti-bribery-and-anti-corruption-policy>



and transparency considering state ownership²⁸. There has been strong progress with private-sector-oriented competitive top management in place, significantly scaled-up ESG capacity and a high share of SDG-linked financing. The Banking law, the Corporate Governance Communique, and the TKYB Law regulate the main responsibilities of the directors, which are broadly in line with international good practice.

5. **The Program Action Plan (PAP) in Annex 6 includes the fiduciary risk mitigation and capacity building measures agreed with the PIAs.**

²⁸ <https://kalkinma.com.tr/en/about-us/corporate-governance/corporate-policies>



ANNEX 4. SUMMARY ENVIRONMENTAL AND SOCIAL SYSTEMS ASSESSMENT

1. **The ESSA examines applicable environmental and social management systems (ESMS) to assess their compliance with the Bank Policy Program-For-Results Financing.** It aims to ensure that the Program’s environmental and social risks will be managed adequately and that the Program complies with the basic principles of sustainable development. Paragraph 9 of the Bank Policy Program-For-Results Financing describes the core principles of environmental and social management that may be considered as relevant or applicable in the ESSA.
2. **The ESSA evaluates the compatibility of the Program’s systems with the core principles on two basic levels: (a) the systems as defined by laws, regulations, and procedures (the ‘system as defined’) and (b) the institutional capacity of implementation entities under the program to effectively implement the system (the ‘system as it is applied in practice’).** It identifies and analyzes the differences between the national systems and the core principles that apply to the Program on the two levels indicated above. The preparation of the ESSA and the development of measures to strengthen the ESMS have benefited from various desk-based reviews and consultative processes with various stakeholders during ESSA preparation. The ESSA was publicly disclosed on [XX], and consulted upon in the period from [XX] to [XX].
3. **The key implementing agencies are the Ministry of Energy and Natural Resources (MENR), Energy Market Regulatory Authority (EMRA), TSKB and TKYB.** The borrowers and implementing agencies are TSKB and TKYB, who will on-lend IBRD loans to Distributed Solar PV (DSPV) customers, developers and aggregators. The two financial intermediaries (FI)s are responsible for achieving the DLIs under Result Area 1 and 2. TKYB and TSKB will have the responsibility to implement, monitor and report on the agreed ESSA Program Action Plan.
4. **The Program’s Social risk is assessed as Moderate, and Environmental risk as Moderate.** The main social and environmental risks and impacts are associated with the Results Area 1 - Developing the market ecosystem: Scale-up of distributed solar PV supporting installation of rooftop and ground-mounted solar panels and BESS, for commercial and industrial self-consumption and Results Area 2 - Unlocking commercial financing and innovation for distributed solar PV, battery energy storage systems, and untapped market, which will scale and support innovation for less commercial market segments micro, small and medium enterprises (MSMEs). Rooftop and ground-mounted solar panels PV and BESS will have certain environmental adverse risks and impacts such as: (i) waste management due to the installation, operation, maintenance, and decommissioning (disposal/recycling of not-in-use solar panels); (ii) dust and noise due to construction/installation works; (iii) sanitary wastewater management’ (iv) road and traffic safety associated with movement of construction vehicles and solar PV transportation; (v) occupational health and safety risks for workers engaged in construction/installation/operation works such as working with high voltages, electrical equipment, direct current, working at heights, heavy lifting and potential fire/explosion and chemical hazards; (vi) community health and safety risks during installation, operation and disposal of not-in-use solar panels and other electric equipment needed for rooftop solar PV (RSPV), ground-mounted solar PV and BESS, and during construction of distribution lines; these may include potential fire/explosion, traffic safety, construction and maintenance activities in and around the settlements, (vii) resource use such as energy, water and raw materials and (viii) land clearance for installation of ground-mounted solar PV and BESS and for distribution lines to connect the ground-mounted solar PV with the distribution network. Low voltage distribution lines will be treated as associated facilities, because sub-loan borrowers will not be responsible for their construction. However, distribution line construction (installation of poles) may be required to connect the DSPV to the grid.
5. Potential social risks and impacts include (i) potential need for land acquisition for installation of ground-mounted solar PV and BESS; (ii) temporary land use restriction during the construction/installation of the distribution lines to connect the ground-mounted solar PV with the distribution network and (iii) community health and safety risks during



installation, operation and disposal of RSPV, ground-mounted solar PV and BESS, and during distribution lines construction; and (iv) contextual risks associated with child and forced labor risks in the supply chain of PVs, which will be addressed under the Program through requiring commitments & declarations in the procurement & contract documents regarding not using forced labor.

6. The likelihood for construction of last mile low voltage distribution lines is assessed as low to moderate, and may occur in few cases. Thus large civil works are not expected within the scope of the Program. It is expected that the land will be acquired on a willing buyer – willing seller basis, with private parties (land owners and private companies) involved in these market-based transactions. Risks related to cultural heritage and biodiversity sensitive areas impacts are not expected, because investments with such impacts will not be eligible for financing under the PforR. TKYB's and TSKB's ESMS (discussed in chapter 4) will screen for such risk and impacts and eliminate them for Program eligibility. Overall, impacts caused by the activities under Results Area 1 and 2 are likely to be short term and site specific and can be mitigated by applying national laws and requirements of TKYB's and TSKB's ESMS. Solar PV installation works will be carried out by licensed companies specializing in PV installation.

7. Under Results Area 2, TSKB and TKYB will on-lend to FBs to reach the untapped market segments. The POM will include clear eligibility criteria for FBs including a requirement for ESMS procedures. Only PFI who meet eligibility criteria including a requirement for an adequate environmental and social management system (ESMS) and capacity to implement the E&S due diligence and ESMS will be included in the Program.

8. Environmental and Social Systems Assessment: The Government of Türkiye has followed the global environmental developments in terms of legislation and administrative systems. The environmental legislation had been structured under the Environmental Law of 1983 with supporting by-law, regulations and other legislative instruments including Regulation on Environmental Impact Assessment, Management of Waste, and Zero Waste. Environmental Law formed the backbone of the environmental regulatory system currently in force. Supporting legislation in the form of by-laws and normative acts gives technical specifications, establishes thresholds, details procedures, and provides other tools for enforcing policies and framework laws. As of today, the administration of environmental issues has been executed by Ministry of Environment, Urbanization and Climate Change (MoEUCC).

9. **Türkiye has a relatively well-developed policy and legal framework on environmental assessment, waste management, land and labor and OHS issues.** Recently amended EIA aligned with the EU regulation and international good practice guidance. The EIA Regulation requires screening, scoping, avoiding, minimizing, and mitigating adverse E&S impacts of the proposed activities as well as compensating for the residual impacts. Recent amendments also include social aspects such as a requirement for social assessment and SEP preparation. Labor and OHS regulation is aligned with ILO conventions. The Constitution prohibits forced labor, which is also treated as a criminal act under the law. One shortfall of the environmental regulation is that it does not apply any due diligence to small-scale works. Such activities are not subject even to the environmental screening, which means that small works that may carry environmental risks under certain circumstances would not be identified, and no mitigation measures would be applied to them. Furthermore, the Regulation requires full-scale environmental impact assessment for high/substantial risk activities (Annex 1 activities) and Screening and scoping documentation for substantial/ moderate risk activities (Annex 2 activities) which would include mitigation measures and commitments as appropriate to the risk level of the activities. No simpler environmental management instruments (e.g., self-standing environmental management plans) are required for low risk operations.

10. **The laws on land expropriations and voluntary market based transactions are comprehensive and adequate. The main gap relates to the eligibility of informal land users for any type of assistance.** National laws do not provide for explicit requirement for livelihood restorations of affected persons.

11. **While waste management regulation is detailed, it does not expressly require the recycling of the solar panels and BESS components.** GT approved in 2022 Regulations on the Management of Waste from Electric and Electronic



Equipment, providing for separation, collection, and organized storage of e-waste with the purpose of turning in to producers for recovery and recycling. The regulation does not include the solar panels and BESS as specific equipment. **Solid waste management and recycling infrastructure, including facilities for the disposal of waste have room for improvement especially for the disposal of not-in-use solar panels and BESS.** Management of Waste Regulation introduces hierarchy of handling waste that prioritizes minimization of waste streams; requires waste separation, reuse, and recycling; promotes 'polluter pays' principle, and extended producer responsibility. The regulation does not clearly impose the recycling of the solar panels and BESS. GT approved in 2022 Regulations on the Management of Waste from Electric and Electronic Equipment, providing for separation, collection, and organized storage of e-waste with the purpose of turning in to producers for recovery and recycling. The regulation does not include the solar panels and BESS. The Regulation on the Waste Batteries and Accumulators (Last Amendment in 2014) require waste batteries and accumulators to be stored, labelled, transferred, and disposed as per the regulation requirements. This regulation does not provide clear instructions for the management of discarded solar panels and BESS units, either.

12. **TSKB and TKYB have comprehensive ESMSs, which also rely on the international E&S standards.** Their ESMSs address some of the gaps with national laws identified above. Both TSKB and TKYB have established ESMS that assess E&S risks; seek to avoid, minimize or mitigate adverse impacts; and monitor the E&S performance of its investments. Both TSKB and TKYB have in place OHS Policies, and accident reporting procedures. TSKB and TKYB have in place risk and impacts screening procedures including screening environmental and land impacts, and a requirement for project sponsors to prepare RAPs in line with international standards.

13. **Both MENR and EMRA follow the national legislation and its mandatory requirements and procedures (i.e. EIA Regulation) with regards to environmental and social assessments to be carried out for the projects.** However, MENR would benefit from establishing an external communication and grievance mechanism accessible to people affected by the investments in the energy and natural resources sectors. Such mechanism would help stakeholders to express their views on MENR interventions in the sector.

14. **National regulations governing labor conditions and occupational health and safety are aligned with International Labor Organization conventions.** Depending on the nature of operations and number of personnel employed, all legal entities are required to have designated occupational health and safety professionals on staff or on advisory contracts. The regulations also include provisions on workers' accommodation.

The proposed ESSA Action Plan focuses on TKYB's and TSKB's E&S staffing, monitoring and reporting and exclusion criteria. It also proposes an approach for recycling not-in-use solar PVs as well as establishment of MENRA's grievance mechanism. Detailed actions are included in the PAP.



ANNEX 5. PROGRAM ACTION PLAN

Action Description	Source	DLI #	Responsibility	Timing		Completion Measurement
Program design and technical implementation support	Technical	NA	TSKB and TKYB	Other	First twelve months	First sub-loans issued and first verification completed
Amendment of Türkiye’s energy market by-law to provide for aggregation of distributed energy resources	Technical	NA	EMRA	Other	2024 for demand-side amendments; 2026 for supply-side amendments	EMRA amends by-laws and/or regulations to fully provide for aggregation of supply-side and demand-side distributed energy resources, building on recent amendment of the Energy Market Law
Short term strategic plan for decarbonization of energy sector in place with policy direction, including near-term targets, to reduce the intensity of annual GHG emissions per volume of electricity generated broadly consistent toward zero by 2053	Technical	NA	MENR	Other	12-48 months	Strategic Energy Plan 2024-2028 published
Implementation support, including result, M&E and verification of DLIs	Other	NA	TSKB and TKYB	Other	12-48 months	- All disbursements completed - verifications completed



Awareness workshops - including to present (a) the criteria for transparent and inclusive participation and (b) the FOM, including role of TSKB & TKYB in terms of due diligence, fiduciary and safeguards requirements, and rules of disbursement	Other	NA	TSKB and TKYB	Other	12-48 months	Number of workshops and number of financial institutions participating
Capacity building for DER market	Other	NA	TSKB and TKYB	Other	12-48 months	Number of trainings and number of financial institutions trained
Appoint competent specialists including: one environmental, one social and one OHS specialists to support Program implementation	Environmental and Social Systems	NA	TSKB and TKYB	Other	No later than 30 days after the Effective Date	Maintain required E&S staffing during Program implementation
Hire a qualified social specialist for the Technical and Engineering team	Environmental and Social Systems	NA	TSKB	Other	No later than one year after the Effective date of the Program	Maintain staffing during Program implementation
Report semi-annually on the environmental and social performance of the Program and implementation of	Environmental and Social Systems	NA	TSKB and TKYB	Recurrent	Semi-Annually	Timely submission of semi-annual E&S performance reports



the ESSA Action Plan						
Submit the ESDDs for the five largest sub-projects financing under their respective lending during the semi-annual reporting period [timing TBC].	Environmental and Social Systems	NA	TSKB and TKYB	Recurrent	Semi-Annually	Inclusion of top five exposures ESDDs in the semi-annual E&S performance reports
Submit E&S eligibility report for each candidate facility borrowers (FBs) for lending under Results Area 2 for the Bank’s No Objection	Environmental and Social Systems	NA	TSKB and TKYB	Other	Before signing loan agreement with FBs	Submission of E&S eligibility reports for FBs for the Banks’s No Objection
Monitor E&S performance of FBs, and report to the World Bank every six months	Environmental and Social Systems	NA	TSKB and TKYB	Recurrent	Semi-Annually	Submission of semi-annual E&S performance reports of FBs
Screen all subprojects on land impacts and inform the Bank on any land expropriation cases prior to the actual execution of the expropriation	Environmental and Social Systems	NA	TSKB and TKYB	Other	Prior to the actual execution of the land expropriation in sub-project	Screening conducted, and reported to the Bank
Develop a grievance mechanism procedure and publish it on its website.	Environmental and Social Systems	NA	MENR	Other	One year after the Effective Date	Grievance mechanism procedure disclosed on the MENRA website
Include high biodiversity and cultural heritage	Environmental and Social Systems	NA	TSKB and TKYB	Other	During Program	Exclusion list includes high biodiversity and



risk areas in the exclusion criteria for financing under the Program					implementation	cultural heritage risk areas
Screen all subprojects on biodiversity and cultural resources and inform the Bank on any additional study requirements at any candidate subproject site for the identification and management of risks to biodiversity and cultural resources.	Environmental and Social Systems	NA	TSKB and TKYB	Other	During Program implementation	Screening conducted, and reported to the Bank
Support the development of a Solar Panel Recycling approach.	Environmental and Social Systems	NA	TSKB and TKYB	Other	During Program implementation	To be determined
Integrate Program budgeting, accounting and recording into the existing systems to facilitate monitoring of program funds and expenditures	Fiduciary Systems	NA	TSKB and TKYB	Other	Prior to effectiveness [to be confirmed]	TSKB and TKYB have integrated a module for the Program in their systems.
Internal control systems specific to the Program including DLI verification procedures will be reflected in the Program Operations Manual	Fiduciary Systems	NA	TSKB and TKYB	Other	At the time of preparation of the POM	POM includes a section on internal control and verification procedures specific to the Program.



Auditors engagement letter including Program auditing requirements	Fiduciary Systems	NA	TSKB and TKYB	Other	At the time of engagement of auditors.	Auditors engagement letter includes specific reference to the Program.
Reflect in the POM, procurement documents and sub-loan agreements as appropriate, the required application under the Program of (a) the Bank’s Anti-corruption Guidelines and (b) Forced Labor declarations.	Fiduciary Systems	NA	TSKB and TKYB	Other	At the time of preparation of the POM	POM includes relevant information on anti-corruption and forced labor.
Reflect in the POM, procurement and sub-loan documents as appropriate the mechanism for (a) disseminating the Bank’s debarment and suspension lists, and (b) ensuring no contract under the Program is awarded to entities debarred/suspended by the Bank	Fiduciary Systems	NA	TSKB and TKYB	Other	At the time of preparation of the POM	TSKB and TYKB to check and regularly report compliance.
Reflect in the POM, procurement document and sub-loan agreements as appropriate the	Fiduciary Systems	NA	TSKB and TKYB	Other	At the time of preparation of the POM	Reflected and included in the overall reporting requirement to the Bank



grievance mechanism for addressing complaints of Fraud and Corruption under the Program.						
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ANNEX 6. IMPLEMENTATION SUPPORT PLAN

1. This will be the first PforR program in Türkiye. Therefore, it is critical that implementation support ensure strong capacity building and assistance to mitigate key operational risks throughout implementation. The World Bank’s support will focus on (a) reviewing implementation progress and the achievement of key results and underlying DLIs, (b) supporting stakeholders in addressing issues that arise during implementation and reinforcing institutional capacity, (c) monitoring system performance and compliance with key fiduciary and safeguards requirements, and (d) providing continued technical support in the delivery of program results and operation of the results-based incentive system.

2. Formal implementation support missions and field visits will be organized at least semiannually during the early stage of implementation with smaller missions to be conducted on an as-needed basis. The table below outlines estimated needs and focus during earlier implementation stage and once the program is well under way.

Main focus of Implementation Support

Table with 5 columns: Time, Focus, Skills Needed, Resources Estimate, Partner Role. It details support needs for the first 12 months and 12-60 months.

Task Team Skills Mix Requirements for Implementation Support

Table with 4 columns: Skills Needed, Number of Staff Weeks, Number of Trips, Comments. It lists requirements for project management tasks.



Technical specialists	12	3	
Financial sector specialist	12	3	
Financial management specialist	7	2	
Procurement specialist	7	2	
Environmental specialist	7	2	
Social specialist	7	2	
Administrative support	Ongoing	0	

Role of Partners in Program Implementation

Name	Institution/Country	Role
Türkiye Sınai Kalkınma Bankası (TSKB)	Development bank/Türkiye	PIA
Türkiye Kalkınma ve Yatırım Bankası (TKYB)	Development bank/Türkiye	PIA
Energy Market Regulatory Authority (EMRA)	Regulator/Türkiye	Regulator
Ministry of Energy and Natural Resources (MENR)	Ministry/Türkiye	Ministry



ANNEX 7. CLEAN TECHNOLOGY FUND

Key Indicators	CTF/World Bank-Funded Distributed Solar PV Program	Scaled-up Phase ²⁹
Installed DSPV capacity Installed BESS	878 MW 32 MW	A minimum of 4.5 GW of DSPV estimated by 2030 to meet National Energy Plan overall solar targets and 7.5 GW of BESS to be deployed by 2035
GESP 1: Energy rating (MWh) GESP 2: Power rating (MW) GESP 3: Policies, regulations, codes, or standards adopted for energy storage issues.	64 TBD 2	2029 2029 2027
Tons of GHG emissions avoided <ul style="list-style-type: none"> ▪ Per year ▪ Over lifetime 	0.71 million tons CO ₂ 14.2 million tons CO ₂	4.8 million tons CO ₂ 96.1 million tons CO ₂
Financing leveraged through CTF financing (US\$, millions)	US\$900 million <ul style="list-style-type: none"> ▪ IBRD: US\$600 million ▪ TSKB: US\$57 million ▪ TKYB: US\$57 million ▪ Other private lending: US\$44 million ▪ ESMAP: US\$3 million ▪ Private equity: US\$139 million 	Approximately 5.3 billion needed for DSPV and 4.1 billion for BESS. Expected increasingly large share of private investments over time, covering most of the investment costs.
CTF leverage ratio	1:30	1:315
Cost-effectiveness: <ul style="list-style-type: none"> ▪ CTF cost-effectiveness - \$_{CTF}/tCO₂eq avoided over lifetime ▪ Total Program cost-effectiveness - US\$_{Total Program}/tCO₂eq avoided over lifetime (20 years) 	2.1 65.6	0.3 98.1
Other co-benefits	<ul style="list-style-type: none"> ▪ Increased share of renewable energy in overall generation mix ▪ Increased opportunities of local employment ▪ Reduction of distribution losses due to co-location of generation and consumption 	<ul style="list-style-type: none"> ▪ Same benefits at larger scale with overall strong demonstration impact for both middle income and low-income countries.

²⁹ Note: this is a hypothetical scenario. The project will contribute to the targets set for this phase, but the fulfilment of these targets cannot be attributed exclusively to the project.



Key Indicators	CTF/World Bank-Funded Distributed Solar PV Program	Scaled-up Phase ²⁹
	<ul style="list-style-type: none"> ▪ Contribution to cost reduction in solar PV technologies and further development of local equipment production market ▪ Environmental co-benefit: 410 g/MWh of nitrogen oxides, 3 g/MWh of sulfur oxides, and 3 g/MWh of PM_{2.5} to be reduced annually after the installation of target capacity.³⁰ 	

I. Background: Country and Sector Context³¹

1. **Türkiye is aspiring to achieve carbon neutrality by 2053, which requires major changes to its energy system.** Its ratification of the Paris Agreement in October 2021 and its pledge to achieve net zero emissions were strong signals of the country’s commitment, further reinforced by its submission of the first iteration of its NDC as part of the Paris Agreement process. The GoT has also released its NEP (2022–2035), including targets for RE and BESS deployment (122.7 GW and 7.5 GW, respectively, by 2035), and is also currently working on its Long-Term Decarbonization Strategy and NDP, which will further define measures and actions to address climate change.

2. **Türkiye can achieve energy security through an accelerated pace of deployment of RE and energy efficiency.** This includes least-cost investments in domestic solar and wind—building on its track record of tripling RE capacity in the last decade—and investing in energy efficiency, battery and pumped storage, geothermal, and gas generation with carbon capture and storage (as well as completion of the nuclear plant under construction). This would enable the country to meet a doubling of energy demand by 2053 to fuel its growth ambitions, with the added benefit of lowering emissions and improving energy security by reducing reliance on imported coal, gas, and oil.

3. **Securing long-term energy security is a core strategic priority for the Government.** Türkiye’s high energy and carbon intensity, 145 ktoe/US\$ 2015 and 440 g CO₂e/kWh, respectively (well above the EU averages which are 88 ktoe/US\$ 2015 and 229 g CO₂e/kWh, respectively) make it vulnerable to global energy prices. In the last 20 years, energy has been at the heart of Türkiye’s growth with energy consumption increasing to more than double over this period. Around 75 percent of energy demand is addressed through imports (gas and oil) which contributes significantly to current account deficits. With energy demand projected to increase by 3 percent per year over the next 10 years, it is critical that Türkiye achieves its objective to transition toward clean, renewable energy generation and increase its energy independence.

4. **There is strong government support for RE development, including DSPV, and incipient support for BESS.** However, availability of financing remains a key constraint to advance the energy transition and develop a domestic DSPV and BESS market ecosystem. The GoT has made significant progress with institutional and regulatory reforms to support DSPV and BESS,³² but more remains to be done to further strengthen the enabling environment. In particular, further

³⁰ Based on emissions intensity of CCGT plants in Türkiye, since DSPV generation will displace gas generation.

³¹ See section I and annex 3 for full country and sector context.

³² Following the policy and legislative capacity-building support provided under EU/IPA Energy Sector TA (P151934) Project on electricity storage systems, EMRA published a by-law on May 9, 2021, for Regulation on Storage Activities in the Electricity Market which regulates the installation, connection, and general market activities for storage facilities and updated other regulations to incorporate storage (licensing regulation, connection



regulatory changes are required to expand DSPV to challenging markets and to develop innovative private-driven solutions for BESS.

5. **The BESS market in Türkiye is in very early stages of development and requires further government support for large scale-up.** Following recent regulatory development and the release of the NEP, EMRA started receiving license applications for BESS installations in early 2023. Private sector applications have reached 164 GW of storage capacity, of which 72 GW are for solar associated facilities. However, it is unlikely that these applications will result in actual installed capacity given that capital costs remain high and access to finance is limited for developers.

6. **The World Bank has been requested by the GoT to lend to TSKB and TKYB to support increased investment in DSPV, pilot BESS solutions, and address some of the obstacles to further expanding these markets to underserved segments.** The proposed PforR program provides financing targeted toward growing the DSPV market in C&I market segments and also to grow untapped markets, especially for BESS. In stage 1, TSKB and TKYB will provide direct lending to their customers. In stage 2, they will on-lend, via a facility, to Facility Borrowers (FBs, mostly commercial banks) in order to enlarge and raise capacity throughout the financing market for such investments. As a result of these activities, the ecosystem will be in place to scale up deployment of DSPV and BESS well beyond the lifetime of the Program.

7. **The proposed Program targeting DSPV and BESS will support Türkiye’s energy security and accelerate the overall decarbonization rate by leveraging important private sector resources.** First, development of domestic renewable energy will enhance the country’s energy security: each MWh of distributed solar generation will displace natural gas generation (most of which is imported) advancing not only the country’s decarbonization agenda but also its macroeconomic stability and energy independence. Second, the World Bank Türkiye CCDR highlighted that large investments would be required to decarbonize the Turkish economy, half of which are expected from the private sector. While targeting all market segments, the proposed program will leverage about US\$300 million in private sector financing for segments that are commercially viable, like large C&I consumers, whereas more public financing will be devoted to target untapped and innovative markets, which require larger support to become commercially viable.

Türkiye’s CTF Co-Investment

8. **CTF investment aims to contribute to projects that demonstrate, deploy, or transfer low-carbon technologies that have a significant potential for long-term GHG emission savings.** In Türkiye, CTF investment has accompanied key renewable projects such as the Türkiye Geothermal Development Project, the Private Sector Renewable Energy and Energy Efficiency Project, and the Renewable Energy Integration Project. Table 8.1 summarizes CTF co-investments.

Table 8.1. CTF Co-Investments

CTF Project/Program	World Bank (US\$, millions)	CTF Financing (US\$, millions)
Geothermal Development Project (P151739) - ongoing	250	39.8
Private Sector Renewable Energy and Energy Efficiency (P124898) - closed	1,000	100
Renewable Energy Integration Project (P144534) - ongoing	625	50

and system usage regulation, electricity grid code, regulation on the certification and support of RE resources, and the balancing and settlement regulation). TEIAS announced a Regulation on Technical Criteria of Electricity Storage Facilities in September 2021 specifying the requirements for eligibility to connect to the transmission network and operate in ancillary services. Further amendments to the storage regulation from November 2022 regulate the construction of solar and wind power generation facilities by energy storage developers and allow unlicensed generators subject to monthly settlement to construct storage facilities, among other provisions.



CTF Project/Program	World Bank (US\$, millions)	CTF Financing (US\$, millions)
Renewable Energy Integration Technical Assistance Project (P155510) - closed		1 (grant)
Energy Efficiency in Public Buildings Project (P162762) - ongoing	150	50 (including 3.8 grant)
TOTAL	2,025	240.8

Program Description³³

9. **PDO.** The PDO for this PforR program is to expand Türkiye’s distributed solar photovoltaic market and pilot distributed battery electricity storage. The proposed Program will disburse loans based on the achievement of key results aimed at creating an enabling environment for the scaling-up of DSPV and BESS in Türkiye.

10. **Results areas.** The activities financed will be across two results areas with pre-agreed DLIs for each: (a) scaling-up distributed solar PV, and (b) unlocking commercial financing and innovation for distributed solar PV, battery energy storage systems, and untapped markets. Further details on the underlying activities under each results area and the underlying DLIs are provided in section II - Program Description in the main text and the Technical Assessment in annex 2.

11. **Financing.** The World Bank and CTF financing is expected to mobilize US\$930 million toward reaching the development objective, consisting of US\$600 million from IBRD, US\$57 million each from TSKB and TKYB in co-financing, 44 million from other private lenders, a soft loan of US\$30 million from CTF, a US\$3 million grant from ESMAP, and US\$139 million in private equity.

II. Assessment of the Proposed Program with CTF Investment Criteria

12. **Emission reduction potential.³⁴** The total emission reduction potential is estimated to be 14.17 million tons of CO₂ over the lifetime of the installations (20 years). The emissions savings estimate is based on a construction of a total of around 878 MW of DSPV through the Program with yearly installed capacity shown in the table below. The estimate also accounts for 64 MWh of BESS capacity installed through the program. The baseline scenario uses a CM with an emission factor of 648.8 gCO₂/MWh. The emissions savings were calculated in accordance with CTF and World Bank guidelines.³⁵

Table 8.2. Emission Savings over 5 Years

	Year 1	Year 2	Year 3	Year 4	Year 5
Yearly installed capacity (MW)	—	254	380	98	146
Yearly installed BESS generation (MWh)	—	12.8	32.0	19.2	—

13. **Technology development status.** Following the GoT’s target to achieve 30 percent of RE in its energy mix by 2023, the solar market experienced a boom with installed PV capacity growing from 40 MW in 2014 to 6.7 GW in 2020 and 9.9 GW by the end of 2022. Nevertheless, this boom consisted largely of ground-mounted utility-scale installations. Solar costs have fallen globally, and this has also been reflected locally. The take-up of DSPV systems has been slower and predominantly concentrated in large C&I establishments. Recent regulation allowing for net metering schemes as well as

³³ See section II and annex 2 for further details.

³⁴ See GHG accounting in section IV.D. for further details on the methodology.

³⁵ World Bank Guidance on Greenhouse Gas Accounting for Energy Investment Operations.



regulatory changes to streamline permitting process are expected to lift some of the barriers to wider expansion of the DSPV market. The program will address outstanding barriers, increase stakeholders’ comfort with the technology, increase access to finance, and improve the wider enabling ecosystem. Pilot investments in BESS financed by CTF and regulatory improvements to be supported by the program are also expected to help kick-start the market for BESS in Türkiye.

14. **Cost-effectiveness.** The cost-effectiveness of the Program for CTF funding is US\$2.1/tCO₂eq and US\$65.6/tCO₂eq for the total funding.

15. **Marginal abatement cost.** The estimated marginal abatement cost for the Program per market segment based on the economic analysis is estimated to be US\$47/tCO₂eq for the industrial market segment, US\$53/tCO₂eq for the MSME market segment, and US\$29/tCO₂eq for the residential market segment, which is inferior to the threshold value of US\$100/tCO₂eq used to assess incentives needed to achieve investment. The marginal abatement cost is calculated as the Program’s NPV divided by lifetime avoided CO₂eq emissions (LCO₂).

Table 8.3. Marginal Abatement Cost for the Program by Market Segment

	Industrial	MSME	Residential
Marginal abatement cost (US\$/tCO ₂ eq)	47	53	29

Demonstration Potential at Scale

16. **The proposed PforR Program has great transformational potential as it will contribute to large-scale deployment of DSPV systems throughout Türkiye and across all consumer segments.** TSKB and TKYB’s loans will help develop and expand this market and crowd in commercial financing. The World Bank financing will help support early movers in piloting innovative business models and approaching untapped market segments to demonstrate the viability of these investments.

17. **BESS remains a relatively new technology, and investments in BESS in Türkiye have yet to be tested and business models adapted to its specific characteristics.** As confirmed in a World Bank analysis carried out in 2020–2022, very few BESS applications are commercially viable in Türkiye today. Future enactment of targeted policy and regulations for storage, including incentive systems and innovative investment models, would positively affect market confidence and allow early adopters to move ahead with investments in BESS.

18. **The BESS comprehensive economic and financial analysis shows the need for concessional funding from CTF to de-risk BESS investments and support the design of innovative business models to pilot the commercial and financial viability of BESS in Türkiye.** This in turn will inform new regulatory changes that will be needed to promote BESS. As of today, TKYB and TSKB have a limited number of potential BESS projects in their pipeline, which are on hold due to lack of financing and high perceived risks. Such projects would be able to absorb the envisaged CTF financing as part of the program. Project-specific technical, economic, and financial analysis and due diligence will be carried out for each such project once CTF financing has been confirmed. Only technically, economically, and financially viable projects will be eligible under the program.

19. **In addition, the results-based approach will ensure that lessons learned and systems put in place are internalized and continue well beyond the lifetime of the project.** The experience and expertise developed by all stakeholders in the public and private spaces will be key to a smooth transition to a pure commercial market after project closing. Further, the Program provides an opportunity to put in place the right structures and address any issues with the integration of DSPV



systems in the grid—particularly in local distribution networks. The World Bank support will help ensure that these issues are considered thoroughly and incorporated in capacity building and technical assistance built into the project.

Development Impact

20. **Local employment opportunities.** Scaling up the DSPV market is expected to create opportunities for employment as the Program supports a wide array of business models. This is expected to include the growth of business for not only aggregators, developers, and vendors but also for contractors for the installation, operation, and maintenance of the systems. The local manufacturing sector for panels and other equipment for DSPV systems will also benefit greatly from the expansion of the market and require addition and training of new personnel.

21. **Environmental co-benefits.** As Türkiye’s energy demand grows rapidly to fuel its economic growth, the country relies heavily on imports of gas and oil to fuel this demand. This project will have significant environmental benefits while contributing to Türkiye’s agenda to further increase the share of RE in generation. By displacing CCGT, DSPV is expected to save an equivalent of 410 g/MWh in NO_x, 3 g/MWh in SO₂, and 3 g/MWh of PM_{2.5}.

Government Support

22. **The proposed program is well aligned with Türkiye’s strategic priorities to increase the share of RE in the country’s energy mix and not only achieve positive long-term climate outcomes but also ensure greater energy security.** There is strong support from the GoT for the use of long-term concessional financing to help enable rapid scale-up of DSPV and set the foundations to strengthen and engage the commercial market for investment in untapped market segments such as for residential clients and MSMEs and help develop the market for innovative solutions like BESS.

Leverage

23. The total investment into the proposed program would be funded through CTF (US\$30 million loan), IBRD (US\$600 million), ESMAP (US\$3 million grant), TSKB (US\$57 million), TKYB (US\$57 million) and other private lenders (US\$44 million) co-financing and private equity (US\$104.5 million). The CTF leverage ratio will be 1 to 30. With an addressable market potential of 4.5–8 GW, the program will set an enabling environment for further private sector investment in the expansion of DSPV and BESS toward fully achieving the GoT’s target of 52.9 GW of solar capacity and 7.5 GW of BESS by 2035.

CTF Additionality

24. **CTF’s concessional financing under the Program is critical to address key barriers hindering the expansion of the DSPV market and innovative technology solutions like BESS in Türkiye.** The concessional loan along with IBRD funding will help create the regulatory and institutional framework required and demonstrate new business models to allow for the scale-up of battery storage investments. In turn, this will further reinforce the business case for investment in DSPV systems. Battery storage is a nascent market in which local stakeholders lack experience, and this program will allow for piloting of various uses for storage under concessional terms that will allow for more rapid uptake. Without the concessional funding, TSKB and TKYB would be limited by their lack of experience, transaction cost, and strong risk perception and would not be able to engage in this market at this scale and would not have considered investment in the untapped markets or new technologies like BESS which are targeted by this program. The limited growth in the deployment of BESS would also limit the diversity in the use of DSPV and the role it could play in facilitating the integration of renewables relative to its potential in the market.



Implementation Readiness

25. **TSKB and TKYB will be the borrowers and Program Implementing Agencies (PIAs) for this program.** They will develop a detailed POM that will be reviewed and approved by the World Bank before disbursements can begin. The drafting is currently in progress. TSKB and TKYB are the two largest development banks in Türkiye, and both have extensive experience implementing World Bank-financed projects. The two banks are subject to regulations and oversight from the Banking Regulation and Supervision Agency (BRSA). This Program will allow TSKB and TKYB to lend to DSPV developers and retailers as well as to smaller retail clients through apex banking models where a qualified intermediary bank will receive the financing and on-lend to the client.

26. **There is a strong development rationale for the GoT in selecting TSKB and TKYB as PIAs to scale up the DSPV market.** TSKB and TKYB are Türkiye's leading development banks. As Türkiye's private and public development banks, TSKB and TKYB focus their activities on identified market gaps for nascent markets. Both institutions explicitly align their activities to the SDGs and climate change. TSKB is also the market leader in green finance, providing a demonstration effect for the whole industry in the country, having the best ESG score among the Turkish banks (and good scores globally). TKYB's sustainability projects account for 81 percent of its loan portfolio. In 2021, TKYB became the first and only bank in Türkiye that signed Operating Principles for Impact Management led by IFC. TKYB published its first Impact Report in 2021. The same year, it mediated the issuance of Türkiye's first Low Carbon Economy Transition Bond and Türkiye's first social *sukuk*. TKYB has the second best ESG score among Turkish banks, just after TSKB. Despite their small size, providing less than 2 percent of total banking sector loans, their value creation and impact generation is above the sector. For instance, together, the two institutions have financed 22 percent of the country's total RE capacity (TSKB 15 percent and TKYB 7.5 percent).

27. **The CTF and IBRD funding plays an important role in encouraging early adoption of DSPV and BESS and demonstrating to market players that it is a viable investment.** TSKB and TKYB are interested in participating in the Program since it offers a relatively low-risk entry into an area with significant potential for growth in the future. Their participation in stage 1, and the creation of a facility for on-lending through new stakeholders such as commercial banks in stage 2, lends sustainability, continuity, and follow-up to the program after the IBRD resources are exhausted. The PIAs will be transparent in communicating the limited timing of the availability of concessional loans.

Monitoring

28. **A separate thematic window was established under the CTF for the Global Energy Storage Program (GESP) as a means to accelerate the deployment of energy storage solutions to scale up RE generation, transmission, and distribution.** GESP's primary objectives are to demonstrate and deploy low-carbon technologies, reduce the carbon footprint of the energy sector, and increase energy access and create economic opportunities linked to RE investments and operations. A toolkit was developed outlining the monitoring and reporting system for GESP with guidance on reporting on the progress and performance of projects on key objectives.

29. **The impact of BESS investments will be closely monitored.** In accordance with the CTF GESP toolkit, the PforR will closely monitor the impacts of BESS investments on the development of the DSPV market and also its impact on supporting the acceleration of decarbonization efforts through the following indicators:³⁶

³⁶ For this PforR, the BESS investments will be for only one type of use (generation) and one type of application (distributed storage). As such, no further disaggregation is included in these indicators.



Table 8.4.

Indicator		Target	Target Date	Notes
CTF Core 1	GHG emissions reduced or avoided (MtCO ₂ eq) from BESS	10,492	Annual, starting in 2028 ³⁷	Annual monitoring
		209,837	2044 (over 20 years)	Estimate over the lifetime of project
CTF Core 2	Volume of finance leveraged (US\$, millions)	900	2029	
CTF Core 3	Installed RE capacity (MW) as a result of GESP interventions	32 MW	2029	Estimate accounting for only BESS investments linked to new DSPV installations
GESP 1	Energy rating (MWh)	64.0	2029	The targeted total capacity of BESS projects installed through the program
GESP 2	Power rating (MW)	TBD	2029	The power rating indicates the maximum continuous power absorbed or discharged by the storage system. It measures the rate of flow of electricity in and out of the storage system. Given the uncertainty on the projects that will be financed, this value cannot be determined at this time but will be estimated during appraisal.
GESP 3	Policies, regulations, codes, or standards adopted for energy storage issues	2	2027	The program is expected to support the enactment of regulation for BESS.

³⁷ Annual emission reductions once the full BESS capacity, estimated at 64 MWh, has been installed.



ANNEX 8. TSKB FINANCIAL INTERMEDIARY ASSESSMENT

1. An assessment of TSKB took place at the pre-appraisal stage based on eligibility criteria in accordance with OP 10.0. Eligibility criteria included the following:

- (a) The bank must be *duly licensed* and at least two years in operation.
- (b) The bank’s owners and managers must be considered *‘fit and proper’*. The bank must have qualified and experienced management, adequate organization, and institutional capacity for its specific risk profile.
- (c) The bank must be in *‘good standing’* with its supervisory authority (that is, it should meet all pertinent prudential and other applicable laws and regulations) and remain in compliance at all times.
- (d) The bank must maintain *capital adequacy* prescribed by prudential regulations.
- (e) The bank must have *adequate liquidity*.
- (f) The bank must have *positive profitability and acceptable risk profile*. It must maintain the value of its capital.
- (g) The bank must have well-defined policies and written procedures for *management of all types of financial risks* (liquidity, credit, currency, interest rate, and market risk, as well as risks associated with balance sheet and income statement structures) *and operational risk*.
- (h) The bank must classify its assets and off-balance-sheet credit risk exposures (at least four times per year) and make adequate provisions. It must have *adequate portfolio quality*. The bank should not have more than 10 percent of criticized assets (that is, classified as doubtful and loss).
- (i) The bank must have *adequate internal audits and controls*.
- (j) The bank must have *adequate management information systems*.

2. A detailed confidential appraisal report has been filed internally. The summary results of the report are presented in Table 9.1. The appraisal was based on the following sources of information: (a) audited financial statements as of December 31, 2022; (b) written information provided by the bank; and (c) interviews with senior management.

Table 9.1. Summary of TSKB Appraisal

Criterion	Comments/Actions
1. License	Criterion met
2. Owners/managers ‘fit & proper’, governance quality	Criterion met
3. Good standing with the regulator	Criterion met
4. Capital adequacy	Criterion met
5. Liquidity	Criterion met
6. Profitability	Criterion met
7. Policies and risk management functions	Criterion met
8. Asset quality and provisions	Criterion met
9. Internal audit and controls	Criterion met
10. Adequate management information system (MIS)	Criterion met



Background on TSKB

3. **TSKB, a privately owned development bank, provides investment and working capital loans to private sector companies.** The bank was established in 1950 as the first private development and investment bank by the GoT with the support of the World Bank, Central Bank of Republic of Türkiye, and commercial banks. As per the Articles of Association published in the Official Gazette on June 2, 1950, the aim of the bank is to support private sector investments at mostly industrial sectors, to help domestic and foreign capital owners to finance the new firms, and to help the improvement of Turkish capital markets. The bank’s mission has been to help domestic and foreign capital owners to finance the new enterprises and to contribute to strengthening capital markets. TSKB operates as a non-deposit-accepting bank, and today, it provides loans and project finance.

4. **TSKB’s headquarters are located in Istanbul, and it has one branch in Ankara for representation purposes only.** TSKB is majority owned by Isbank Group. TSKB is 50.5 percent owned by Türkiye Is Bankasi A.S. Group (Isbank Group) and 8.4 percent by Türkiye Vakıflar Bankasi T.A.O (Vakıfbank) with the remainder by other institutions and individuals quoted in Borsa Istanbul as of year-end 2022. The bank’s management is overseen by Isbank Group that nominates the chief executive officer (CEO) and 6 of the 11 members in the Board of Directors including the chairman. One member is nominated each by Türkiye Vakıflar Bankasi T.A.O and MoTF. There are three independent members. Members of the board come predominantly from banking and management backgrounds.

5. **TSKB is the 12th largest bank by assets and loans and the largest development bank by shareholders in Türkiye as of end-2022.** The loans-to-assets ratio stood at 74 percent at end-2022. Total assets grew by 37 percent year-on-year in 2022 to TRY 117.6 billion (US\$6.3 billion), with loan growth at 28 percent. TSKB only lends to private companies. The loan portfolio distribution by leading sector includes electricity generation (39 percent—of which 35 percent renewable), financial institutions (10.4 percent), metals and machinery (7.2 percent), tourism (5.6 percent), health and education (5.2 percent).

Table 9.2. Summary of TSKB Financial Indicators

(TRY, millions)	2018	2019	2020	2021	2022
Total assets	38,269.40	42,253.00	52,430.90	86,092.50	117,621.60
Financial assets	8686.00	7,014.60	9,098.00	17,362.60	24,129.70
Total loans (gross)	27,843.70	31,644.40	39,380.50	67,590.60	86,830.40
NPLs	597.20	1,107.70	1,689.70	3,123.50	5,520.00
Total borrowings	25,401.90	28,458.30	34,631.70	54,274.00	70,814.10
Paid-in capital	2,800.00	2,800.00	2,800.00	2,800.00	2,800.00
Equity	4,184.00	5,178.90	6,139.70	7,021.80	12,992.50
Net interest income	1,728.70	1,911.20	2,022.30	2,898.30	6,870.60
Net profit	663.20	736.10	709.40	1,097.30	4,105.70
Ratios (percent)					
Total loans/total assets	72.80	74.90	75.10	78.50	73.80
NPLs/total loans	2.10	3.50	4.30	4.60	6.40
Total borrowings/total liabilities	66.40	67.40	66.10	63.00	60.20
Equity/total assets	10.90	12.30	11.70	8.16	11.90



(TRY, millions)	2018	2019	2020	2021	2022
Capital adequacy ratio (CAR)	15.99	17.39	19.37	20.80	22.40
Return on average assets (RoAA)	1.94	1.82	1.49	1.58	4.03
Return on average equity (RoAE)	16.79	15.72	12.53	16.67	41.02

Source: Audited consolidated financials.

6. As a privately owned development and investment bank, TSKB has a unique status in Türkiye’s financial system.

It is fully wholesale funded and does not have a deposit-taking license. It funds its operations through international financial institution funding, external loans, and capital market transactions. It has been providing investment loans and funding projects in areas of strategic importance to the authorities, although the bank has been diversifying its operations. Most of its borrowings are in foreign currency, matching its loan book, and borrowings are predominantly long term. TSKB’s rating was downgraded to B– from B by Fitch Ratings in July 2022. Fitch downgraded the ratings of 25 banks simultaneously, following the downgrade of the sovereign rating to B with a negative outlook. The downgrade reflects heightened operating environment risks, including exchange rate volatility, high inflation, and weak monetary policy credibility. The ratings are driven by the bank’s stand-alone risk profile in the heightened operating environment pressures and also reflect the bank’s niche policy role, development bank focus, and record of relatively consistent performance. These are balanced by the concentration of TSKB’s operations in the high-risk Turkish operating environment, which heightens pressure on its credit profile and capitalization. The ratings also acknowledge a high propensity by the Government to provide support. In 2021, 100 percent of international borrowing was ESG focused. In addition, TSKB is listed on Borsa Istanbul, with a market value reaching US\$756 million on December 16, 2022.

7. TSKB’s loan portfolio primarily consists of medium- to long-term loans and is denominated mainly (90 percent) in foreign currency.

On a remaining maturity basis of the bank’s loan portfolio as of end-2022, 33 percent had maturity of less than one year and 18 percent had five years or longer. The loan portfolio’s average maturity stood at 5.1 years. Close to 39 percent of the bank’s assets had remaining maturities of one year or less and 41 percent of assets with maturity of 1–5 years. As of December 31, 2022, the bank maintained a positive liquidity gap for maturities (by group) except for over five years. By currency, loans were denominated in US dollar (55 percent), followed by euro (35 percent) and Turkish lira (10 percent). TSKB’s loan concentration is high as its top 100 cash loans comprised 78 percent of the total loan portfolio.

8. TSKB’s main source of funds is borrowing from international financial institutions.

As of December 2022, borrowings from international development finance institutions made up 68 percent of TSKB’s non-equity funding. These were complemented by securities, which were predominantly in foreign currency (98 percent) making up 22 percent. TSKB also issued subordinated debt instruments representing 4 percent. The funds obtained internationally consist of medium- and long-term loans borrowed from the WBG, European Investment Bank, Council of Europe Development Bank, Islamic Development Bank, Asian Infrastructure and Investment Bank, and German Development Bank.

9. TSKB’s credit risk has remained broadly unchanged.

Its NPL ratio stood at 2.6 percent as of 2023Q1 (2021: 3.1 percent). The Stage 2 loans ratio was 10.3 percent in 2023Q1 (2021: 13.3 percent). The NPL and Stage 2 ratios were not affected by expired forbearance measures introduced in response to the COVID-19 crisis that allowed for a more relaxed classification of problem loans. Sources of risks stem from the deteriorating operating environment, including the Government’s heterodox credit market interventions, high foreign exchange (FX) loan exposure (91 percent), high single exposure risk, and concentrated lending to the energy sector. Reserve coverage continues to improve as TSKB provides for expected losses based on the IFRS-9 forward-looking approach (provisions were 92 percent of NPLs in 2022 compared to 47 percent in 2021). The coverage ratio of the NPL book including collateralizations and provisions is 187 percent. Net profits surged by 132 percent (year on year) in 2022, with the help of increasing net interest margins and security portfolio



valuations owing to the high share of Consumer Price Index-Linkers. RoAE and RoAA increased to 42 percent (16.7 percent in 2021) and 4.9 percent (1.6 percent in 2021), respectively.

10. **TSKB carefully manages the FX risk in its balance sheet.** As a development bank in which investment loans have the majority weight in the loan book, the collateralization is focused on assets generating FX income, supported by cash, equity pledges, mortgages, pledges on immovables and guarantees, and so on. The currency sensitivity analysis is conducted on an annual basis (more often than annual when needed), which is already integrated into the bank's internal rating model. TSKB's currency sensitivity analysis encompasses a multifaceted approach based on the following criteria:

- FX open position
- Client's export volume and FX income generation
- Client's import volume and FX costs
- Debt stock and maturity structure of debt
- Client's cash generation and capability to pay back the debt
- Whether hedging instruments are used
- Group support.

11. **Based on the latest analysis, TSKB do not foresee a material risk with respect to Turkish lira depreciation.** The bank does not have any currency mismatch in its balance sheet. FX revenue generation capability is one of the top priorities that TSKB seeks out at its clients. During credit appraisal and evaluation studies, apart from approximately 5 percent of the loan book, all clients are exporters or companies that have the capacity to manage the currency depreciation risks due to FX revenue generation.

12. **Capitalization continues to be under pressure due to Turkish lira depreciation despite the benefit from forbearance measures and remains tight considering TSKB's exposure to FX risk.** The total CAR was 22.4 percent in 2022 (2021: 20.8 percent, 2020: 19.4 percent, and 2019: 17.4 percent), and the Tier-1 capital ratio was 21.3 percent (2021: 12.7 percent, 2020: 13.4 percent, and 2019: 12.1 percent). CAR and Tier-1 capital ratios excluding forbearance measures that allow banks to use a more favorable exchange rate were 17.9 percent (2021: 15.3 percent) and 16.7 percent (2021: 8.9 percent), respectively. Lira depreciation has eroded capital ratios not benefitting from forbearance due to the increase in FX risk-weighted assets and mark-to-market valuation but has supported capital through the subordinated debt revaluation. Further FX depreciation would intensify these pressures. In addition to FX risk, CAR is also sensitive to asset quality deterioration amid high concentration risk.

13. **TSKB is rated 'B-' by Fitch and 'B3' by Moody's, one notch below Türkiye's sovereign rating by the former and at par by the latter agency.** The ratings are driven by the bank's stand-alone risk profile in the heightened operating environment pressures. The ratings reflect the bank's niche policy role, development bank focus, and record of relatively consistent performance. These are balanced by the concentration of TSKB's operations in the high-risk Turkish operating environment, which heightens pressure on its credit profile, and adequate capitalization. The ratings also acknowledge a high propensity by the Government to support, which would ultimately imply limited support given the increased potential for stress in the country's external finances.



Table 9.3. Summary of TSKB Regulatory Compliance

As of December 31, 2022	Legal Requirement		TSKB
Capitalization ratios			
CAR:	not less than	12.00% ^a	22.40%
Tier 1 ratio:	not less than	6.00%	21.28%
Liquidity coverage ratios (LCRs)^b			
Weekly liquidity ratio:	not less than	100.00%	268.00%
Weekly liquidity ratio (foreign currency)	not less than	80.00%	322.00%

Note: a. Legal ratio 8.0 percent although the regulator encourages to target a minimum of 12 percent.

b. TSKB, as a development and investment bank, is exempt from LCR requirement.

14.

15. It adopted a Sustainability Policy in 2012 (updated in 2022), Climate Change Mitigation and Adaptation Policy in 2021, and integrated climate-related and environmental considerations into its governance arrangements. Under the policies, TSKB committed to consider mitigation and adaptation to climate change in all its activities and internal operations. TSKB aims to have more than 90 percent share of SDG-linked loans and a 60 percent share of climate and environment-focused SDG-linked loans in the total portfolio by 2025. For its direct impact, TSKB aims to reduce its scope 1 emissions by 42 percent by 2030, and by 63 percent by 2035. On the governance side, TSKB’s organizational structure for sustainability involves the Board of Directors and the Executive Committee and comprises all employees. The Board of Directors guides the bank’s operations in line with the adopted sustainability strategy.

16. All sustainability works including coordination of the activities and business plans are conducted by two main pillars: the first pillar is the Sustainability Committee, established in 2014, consists of four Board Members as well as the CEO and three Executive Vice Presidents. The second pillar is the Sustainability Management Committee, chaired by the CEO and led by three Executive Vice Presidents with the head of working groups from various departments that are responsible for rolling out sustainability activities throughout the bank. TSKB also plays an active role in national and international initiatives in the field of sustainability (for example, United Nations Environment Programme Finance Initiative, UN Global Compact, Global Reporting Initiative, International Development Finance Club, and Konya Climate Council).

17. **TSKB monitors its green portfolio and provides disclosures in line with the Task Force on Climate-related Financial Disclosures (TCFD).** TSKB’s sustainability reporting practice started in 2009 and evolved into integrated reporting in 2016. Since 2018, it illustrates its strategy, targets, performance, value creation scheme, and impacts driven by its operations via its integrated annual reports. Given that a national taxonomy is not in place yet, TSKB uses its own taxonomy, with 11 sectors identified for loan-tagging and reporting. TSKB identifies impacts and manages risks from own operations via the ISO 14001 Environmental Management System certification. E&S impacts from its lending operations are managed using 'TSKB Environmental and Social Risk Evaluation Tool' (ERET). ERET is an evaluation model that rates projects based on five criteria under 35 separate headings, including evaluation of physical and transition risks that are to be further developed by end-2023. The GHG emissions and energy and resource efficiency dimensions of the financed projects are also considered. The results of such evaluations are considered in the project assessment, financing, and investment monitoring processes. Customers then take measures to prevent or mitigate E&S impacts considered to be negative and draft an Environmental and Social Action Plan when necessary. TSKB is among the Best Banks in the Global Arena with an ESG Risk Rating of ‘Negligible Level’. Continuing to raise the bar with its ESG performance every year, TSKB improved its



ESG risk rating from 13.6 to 7.9 in 2022. With this rating, TSKB ranked 12th among global development banks, 15th in the global banking sector, and 60th among approximately 15,000 institutions evaluated by Sustainalytics. It also publicly discloses information on climate-related risks. In 2021, TSKB issued the first TCFD-compliant climate risk report. TSKB broke new ground in Türkiye with its Responsible Sustainability Communication Policy published just before COP27. Within the scope of COP27, the bank actively participated in panels on climate-related risks and the role of the financial sector in Türkiye, low-carbon economy, gender equality, and sustainable infrastructure investments and shared important information closely related to Türkiye's sustainability agenda after the summit.

18. **TSKB has raised the score of its Climate Change Report, which it has been publishing since 2010 within the framework of the Carbon Disclosure Project (CDP), to leadership level.** In 2013 and 2015, the bank was granted the Climate Change Leadership Award by CDP Türkiye, and since 2016, it has maintained its 'B' score. It has achieved significant progress with its ambitious targets and decisive steps regarding carbon emissions as of 2022, raising its score to 'A-'. TSKB now ranks at the top 21 percent in the world and among the top Turkish banks.

19. **The first green/sustainable bond in Türkiye was issued by TSKB in 2016.** TSKB issued three green/sustainable bonds for a total amount of US\$1.05 billion. The first green/sustainable bond issuance was in 2016 for US\$300 million, followed by a sustainable subordinated bond issuance in 2017 and another sustainable bond issuance in 2021. Funds obtained through bonds are used to finance green and social projects in line with the Sustainable Finance Framework. TSKB submits an allocation and impact reporting to its investors annually to provide them with an insight into the impacts of the projects financed through the funds from the bond issuances. In addition, TSKB funding includes syndicated loans tied to ESG rating and sustainability performance criteria. In 2022, the syndicated loan was linked to three ambitious sustainable key performance indicators in line with the bank's medium- to long-term targets. TSKB also has a market-leading subsidiary, Escarus, in sustainability assessment area. Escarus is providing services to almost all World Bank clients in establishing sustainability frameworks and is the only domestic independent verifier in this area.



ANNEX 9. TKYB FINANCIAL INTERMEDIARY ASSESSMENT

1. An assessment of TKYB took place at the pre-appraisal stage based on eligibility criteria in accordance with OP 10.0. Eligibility criteria included the following:

- (a) The bank must be duly licensed and at least two years in operation.
- (b) The bank’s owners and managers must be considered ‘fit and proper’. It must have qualified and experienced management, adequate organization, and institutional capacity for its specific risk profile.
- (c) The bank must be in ‘good standing’ with its supervisory authority (that is, it should meet all pertinent prudential and other applicable laws and regulations) and remain in compliance at all times.
- (d) The bank must maintain capital adequacy prescribed by prudential regulations.
- (e) The bank must have adequate liquidity.
- (f) The bank must have positive profitability and acceptable risk profile. It must maintain the value of its capital.
- (g) The bank must have well-defined policies and written procedures for management of all types of financial risks (liquidity, credit, currency, interest rate, and market risk, as well as risks associated with balance sheet and income statement structures) and operational risk.
- (h) The bank must classify its assets and off-balance-sheet credit risk exposures (at least four times per year) and make adequate provisions. It must have adequate portfolio quality. The bank should not have more than 10 percent of criticized assets (that is, classified as doubtful and loss).
- (i) The bank must have *adequate internal audits and controls*.
- (j) The bank must have *adequate management information systems*.

2. A detailed confidential appraisal report has been filed internally. The summary results of the report are presented in Table 10.1. The appraisal was based on the following sources of information: (a) audited financial statements as of December 31, 2022; (b) public information provided by TKYB; and (c) information from TKYB management.

Table 10.1. Summary of TKYB Appraisal

Criterion	Comments/Actions
1. License	Criterion met
2. Owners/managers ‘fit & proper’, governance quality	Criterion met
3. Good standing with BRSA	Criterion met
4. Capital adequacy	Criterion met
5. Liquidity	Criterion met
6. Profitability	Criterion met
7. Policies and risk management functions	Criterion met
8. Asset quality and provisions	Criterion met
9. Internal audit and controls	Criterion met
10. Adequate MIS	Criterion met



Background on TKYB

3. **TKYB, a state-owned development bank, provides investment and working capital loans to private sector companies.** According to TKYB’s law, the objective of the bank is supporting investments and projects concerning sustainable growth in line with the development objectives of Türkiye, using modern development and investment banking tools. The bank was established in 1975 to channel remittances of Turkish expatriate workers to finance private sector development. Over the years, the mandate of TKYB was broadened to support the development of joint-stock companies in various sectors, provide technical assistance to investors, and promote the development of capital markets. Currently, TKYB provides project finance, corporate finance, and investment banking services for its clients focusing on industry investments, renewable energy, energy and resource efficiency, tourism, education, health, and wholesale banking. TKYB employs 305 staff, with headquarters in Istanbul.

4. **TKYB is majority government owned.** The MoTF holds a 99.08 percent stake in TKYB; the remaining shares are listed on the Borsa Istanbul stock exchange. The Board of Directors consists of six members elected by the General Assembly. Two members hold government roles, two are independent, and the fifth member is the CEO, who has private and development banking experience. The CEO is appointed for a term of three years by a Presidential decree. Members of the Board of Directors may be elected for a maximum term of three years. According to the Banking Law No. 7147 and the Articles of Association, the Board of Directors convenes at least once a month and takes decisions with the majority of the members present at the meeting. The current Chairman of the Board of Directors is a Deputy Minister of Treasury and Finance. TKYB is subject to BRSA's prudential oversight. The bank has several committees—Audit Committee, Lending and Participation Committee, Assets and Liability Management Committee, Remuneration Committee, Corporate Governance Committee, and Environmental Management Committee.

5. **TKYB is the 15th largest bank by assets in Türkiye as of end-2022.** Total assets grew by 90 percent in 2022 from TRY 48.4 billion to TRY 91.7 billion, with loan growth at 61 percent. Total loans stood at TRY 37.5 billion as of end-2022 with loans-to-assets ratio of 66 percent. The faster growth of assets can be explained by the capital injections from the Government. TKYB’s financial position is highly dependent on developments in Türkiye’s macro environment. The bank only lends to private companies. The loan portfolio distribution by sector includes energy (45 percent), manufacturing (30 percent), financial institutions (21 percent), and other sectors (4 percent).

Table 10.2. TKYB’s Key Performance Indicators

TRY, millions	2018	2019	2020	2021	2022
Total assets	15,714.8	19,375.9	28,073.4	48,378.7	91,699.8
Financial assets	1,895.6	3,242.7	6,141.9	8,421.5	24,342.8
Total loans (gross)	13,641.5	15,009.5	20,252.4	37,483.2	60,340.3
NPLs	50.3	5,6	68.1	855.1	894.4
Total borrowings	14,297.5	17,019.5	24,485.2	37,910.9	63,339.7
Paid-in capital	500.0	850.0	1,600.0	2,000.0	2,500.0
Equity	1,417.3	2,356.4	3,588.2	4,465.6	6,853.7
Net interest income	456.7	707.7	737.3	1,377.1	3,004.3
Net profit	160.3	447.1	501.8	816.5	1,700.4
Ratios (percent)					
Total loans/total assets	86.8	77.5	72.1	77.5	65.8



TRY, millions	2018	2019	2020	2021	2022
NPLs/total loans	0.9	0.8	1.1	2.3	1.5
Total borrowings/total liabilities	91.0	87.8	87.2	86.3	74.7
Equity/total assets	9.0	12.2	12.8	9.2	7.5
CAR	14.2	22.3	22.4	14.3	16.7
RoAA	1.0	2.6	2.2	2.1	2.4
RoAE	11.3	23.7	19.5	20.3	30.0

Source: Audited consolidated financials.

6. **TKYB has a policy role to support prioritized sectors in national development plans and strategies.** The loan portfolio concentration in energy, manufacturing, and financial institutions (through apex lending) suggests a portfolio composition oriented toward large-ticket exposures. Asset quality benefited from nominal loan growth and loan book comprising long-term, slowly amortizing project finance and apex lending via commercial banks. Credit risk is also mitigated by government-guaranteed FiTs for renewable energy exposures. Nonetheless, the loan portfolio is highly concentrated, with the top 100 cash credit exposures equal to 88 percent of gross loans as of end-2022.

7. **The loan portfolio consists primarily of direct loans (66 percent of gross loans at end-2022) with 21 percent apex loans, which are loans on-lent to financial institutions.** Direct loans are collateralized mainly by letters of guarantee from Turkish banks. TKYB primarily lends in foreign currency (83 percent as of 2022); however, this is matched with funding predominantly in FX. Loans are channeled through commercial banks and leasing companies. Wholesale lending programs aim to contribute to job creation and increase the competitiveness of SMEs in Türkiye. On a remaining maturity basis (as of end-2022), 69 percent had maturity of less than one year and 21 percent had five years or longer. The loan portfolio’s average maturity stood at 3.5 years. As of December 31, 2022, the bank maintained a positive liquidity gap in up to a month maturity bracket and negative gaps in one month to a year time brackets in terms of repricing dates. Average maturity of funding stood at 5.2 years at end-2022.

8. **TKYB is mainly funded by borrowings from international financial institutions.** It is not deposit taking. Its principal sources of funding are capital contributions and other transfers from the MoTF and loans from domestic and international banks, mainly from development finance institutions. Funding is mainly denominated in foreign currency (94 percent as of end-2022), replicating the loan book structure. The funds obtained internationally consist of medium- and long-term loans borrowed from the WBG, European Investment Bank, Council of Europe Development Bank, Islamic Development Bank, Karadeniz Development Bank, and Japan International Corporation Bank. TKYB acts as an intermediary for channeling funds provided by the MoTF to priority sectors.

9. **Credit risk indicators have improved owing to good collection performance and nominal loan growth.** Asset quality benefited from nominal loan growth and loan book comprising long-term, slowly amortizing project finance and apex lending via commercial banks. TKYB’s NPL ratio decreased from 2.3 percent at end-2021 to 1.5 percent as of end-2022, based on TKYB’s reporting. Credit risk is also mitigated by government-guaranteed FiTs for RE exposures. At end-2022, TKYB recorded 64 percent coverage ratio for its NPL portfolio. Under IFSR9 reporting, 4.7 percent of the loans were stage 2 loans with 5.2 percent provision coverage.

10. **TKYB’s strategy is to avoid maturity, exchange rate, and liquidity risks is by matching lending and borrowing terms.** Although TKYB is exempt from the LCR minimum requirements, the LCR was either above (for all currencies) or near (foreign currency) the minimum requirements stipulated by BRSA (Table 10.3). TKYB’s exchange rate risk management policy is determined based on its financial performance, current economic developments, market trends, and profitability



and efficiency measured by the 'Foreign Exchange Net Overall Position/Equity Standard Ratio' introduced by the regulator. Despite up to plus/minus 20 percent permission of the BRSA (changed to plus/minus 5 percent as of January 2023), the foreign currency position is kept low (2022: -0.82) to avoid adverse effects of Turkish lira volatility on the bank balance sheet.

11. **TKYB manages its currency risk exposure within limits determined by its Board of Directors.** As of end-2022, TKYB's total foreign currency assets amounted to TRY 60.3 billion (66 percent of its total assets) while its total foreign currency liabilities amounted to TRY 63.6 billion (69 percent of its total liabilities). Its foreign exchange position is tracked daily, and the transactions are performed according to the expectations in the market and within limits determined by the Risk Management Principles approved by its board.

12. **Capitalization has benefited from regulatory forbearance measures and is stretched in view of the loan growth as well as Turkish lira depreciation.** The total CAR increased from 14.3 percent at end-2021 to 16.7 percent at end-2022, which is significantly higher than the minimum regulatory requirement of 8 percent and meets BRSA's target ratio of above 12 percent (Table 10.3). The RoAE was 31.1 percent, with the banking sector average standing at 41.6 percent in Q1-2021. The RoAA was 2.4 percent, with the banking sector average standing at 4 percent in 2022.

13. **TKYB is rated 'B' by Fitch, which is the same level as Türkiye's sovereign rating.** The rating reflects the high government commitment to support the bank given TKYB's state ownership, policy role, small size, and the high volume of Turkish treasury-guaranteed funding. The rating also reflects "the increased risks to the ability of the Turkish authorities to provide timely and sufficient support in foreign currency given the increased potential for stress in the country's external finances." Overall, TKYB's operating environment and its performance are highly influenced by the country's macro risks.

Table 10.3. Summary of TKYB Regulatory Compliance

As of December 31, 2022	Legal Requirement		TKYB
CAR	not less than	12.00% ^a	16.66%
Tier 1 ratio	not less than	6.00%	14.43%
LCR ^b			
Weekly liquidity ratio	not less than	100.00%	119.53%
Weekly liquidity ratio (foreign currency)	not less than	80.00%	79.01%

Note: a. Legally 8 percent, although target ratio must be above 12 percent.

b. TKYB, as a development and investment bank, is exempt from LCR requirement.

14. **TKYB has a countercyclical lender role in the sector and always provides financing without distorting the credit market.** The bank has been thematically lending and grant providing (employment creation, climate, RE, COVID-19 response, manufacturing, infrastructure support, and so on) and promoting underserved sectors such as geothermal energy, SMEs, and education.

15. **TKYB became the first and only bank in Türkiye that signed Operating Principles for Impact Management led by IFC.** The bank published its first Impact Report in 2021. The same year, it mediated the issuance of Türkiye's first Low Carbon Economy Transition Bond and Türkiye's first social *sukuk*. TKYB has the second best ESG score among Turkish banks, just after TSKB. 81 percent of TKYB's credit portfolio consists of 'sustainability (green & social)' themed projects. TKYB has financed projects having 7.15% share in the RE capacity in Türkiye. Projects financed reduce the CO₂ emission by 5 million tons per year.